

EDITORIAL NOTES

"This simulator was in development for more than 3 years. It was the serious and hard work of aviation engineers, designers, programmers and real pilots - the staff of 1C:Maddox Games. We were in constant contact with the players community during the development period and tried to implement as many player's suggestions as possible to try to satisfy all user groups. The work is now finally complete. We would like to express our thanks to the thousands of players who helped and supported us during those years. We are also very grateful to all the pilots that were involved in the long tests of the flight models. Finally, we would like to say many thanks to our beta testers, who helped us to eliminate any bugs."

Oleg Maddox, Lead Designer of IL-2 Sturmovik.

"I was a pilot at the 'Bundeswehr' and had the opportunity to fly a rebuilt variant of the ME-109. After testing IL-2 for many hours I have to say that a new generation of flight simulators is born. IL-2 has the best flight models that I have ever seen in a flight simulator. It is not only the best, it is very close to the real thing. Also the graphics and the damage model are amazing...with IL-2 you feel like you are flying in a real WWII surrounding. I say such words about a flight Simulator for the first time, IL-2 is really fantastic."

Andreas Preusse, Pilot, Germany.

"It has been an honour for me to be involved in testing this product. I am one of the few people in the world who realises the amount of effort and dedication that went into this sim - and I'm nevertheless amazed by the results. I think a combination of the IL-2 team's engineering knowledge, real-world flying experience, passion for history and most of all complete devotion to perfection have created something more than a sum of all the parts. IL-2 takes flight simulators to a whole new level. It's the first sim that I enjoy flying more than real planes."

Ilya Shevchenko, Private Pilot, USA.

"For me, IL-2 is a very impressive flight simulator. It brings the feeling of aerial combat very close to real life, as opposed to other sims I've played. It is almost frightening how real the graphics and the flight models are. I also admire how one can now experience everything in front of the computer, from air combat to bomber escort. I almost feel like I'm an active fighter pilot with the German Luftwaffe again. For me, IL-2 represents the most realistic flight simulator ever made, mostly because of the German fighters and the feeling of air combat."

Georg Adam, Lieutenant in the German Luftwaffe, WWII.

"Every WWII computer flight simulator I've seen or flown has been more game than simulator. IL-2 is the first one that looks, feels and sounds like the real thing. I've never seen a flight simulator that made you feel like you were really a ground attack/fighter pilot till I flew IL-2. Now when my Grandsons ask what I did in WWII I'll just sit them down in front of the computer and let them see for themselves."

LT. Chuck Walters. P-47 pilot E.T.O 1943/44





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1 GENERAL FEATURES:

1. Fly 31 types of Russian, German and American aircraft. See them in different camouflage and paint schemes for different times of the year.
2. Fly as pilot or rear gunner.
3. Choose between realistic and simple flight models with many adjustments to various realism settings.
4. See 40 other types of aircraft engaged in large-scale air battles (with camouflage paint schemes changing from summer to winter).
5. Engage in air-to-air and air-to-ground battles.
6. Destroy any ground object, such as buildings, bridges, airfields, etc.
7. Play quick missions using full mission parameter settings.
8. Play different types of single missions.
9. Play campaign missions and track your career (with ranks and awards).
10. Fight against intelligent AI opponents.
11. Play two different multiplayer modes: dog-fighting or cooperative missions across a LAN or the Internet with dedicated servers for online play.
12. Multiplay: up to 32 players in dogfight and 16 players in cooperative missions. Use custom paint schemes, squadron nose art, numbering on wings and national markings for each single plane.
13. Record a flight track of your flights and edit these tracks. Then play and enjoy your track files or send them to others (the Internet sim community can use these to confirm their online wins/kills).
14. Use network and Internet voice communications for multiplayer sessions.
15. Build new missions and scenarios with an easy-to-use mission builder. Create missions for single or multiplayer sessions.
16. Play new scenarios designed by other players.
17. Use new plane sets and new scenarios from free and/or commercial add-ons, designed by original developers after the release of the sim.
18. See aircraft and ground unit graphics of an exceptionally high quality.
19. See massive air and ground battles between German and Russian airplanes and tanks.
20. See realistic dynamic damage modeling.
21. See realistic 3D environments, including terrain, sky, unique clouds and weather conditions.
22. See realistic smoke, explosions, fire and other special effects.
23. Hear absorbing radio exchanges.
24. Compatible with a wide variety of 3D sound cards or drivers (Aureal 3D 3.0 or EAX 1.0, EAX 2.0).

Minimum system requirements:

PII 400, 128 Mb RAM, 3D Accelerator.

Recommended system:

PIII 600 or faster, 256 Mb RAM, 32-bit 3D accelerator with 32 Mb RAM or higher.

Overall quality will depend directly on the user's processor speed and 3D graphics accelerator.

2 INSTALLATION

1. Insert the IL-2 CD in your CD-ROM drive. The Autorun menu should start automatically. If you disabled Autorun for your CD-ROM, you may need to run the Install procedure manually (using the Windows Explorer) from the CD.
2. Left-click the "Install" button on the displayed Autorun menu.
3. Follow the installation program's instructions to complete the setup. In case of any problems, the installation will stop and notify you of the nature of the matter.

You can also remove (uninstall) the game from your hard drive either from the Autorun menu, or by clicking the Start button, and selecting Programs / Ubi Soft / IL-2 Sturmovik / Uninstall.

3 HARDWARE SETTINGS

Once the installation is complete, the Setup program starts automatically. The program enables you to select the correct settings for your video driver, video card, sound and input devices. In order to do this, you need to know at least the basic hardware types of the devices installed on your PC.



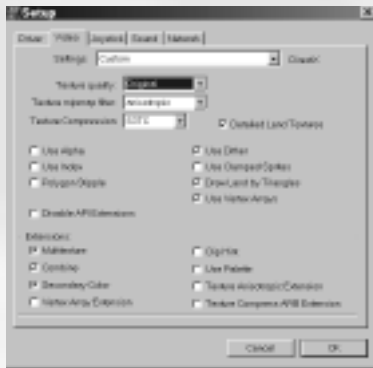
VIDEO

1. Driver - Driver and video mode setup.

These settings are similar to the internal IL-2 Video Modes dialog.

See the corresponding section concerning in-game menus below for a description.





Texture quality - Texture resolution (see below).

Texture mipmap filter - Quality of texture filtering.

Texture Compression - Saves on memory considerably (the highest quality is obtained with S3TC).

Detailed land textures - Use high-resolution textures for landscapes (large amount of video memory and texture compression required).

Use Alpha / Use Index - Use additional texture formats.

Polygon Stipple - Emulate shadow

transparency in the absence of a **Stencil Buffer**.

Dither - Controls dither mode for 16-bit modes.

Use Clamped Sprite - Cuts down the number of polygons on sprite objects and effects.

Draw Land by Triangles - Displays landscapes with simple triangles.

Use Vertex Arrays - Reproduces geometry via vertex arrays.

Disable API Extensions - Forbids the use of video driver extensions.

Multitexture - For multitextures.

Combine - Improved texture combining.

Secondary Color - Used for fog and lighting.

Texture Anisotropic Extensions - enables anisotropic texture filtering.

Texture Compress ARB Extension - enables S3TC compression.

3. Video Modes - Choosing video modes

Driver - Choosing between DirectX8/OpenGL drivers.

Choose the driver that best suits your video card in terms of rendering speed and quality.

Resolution - Choosing the screen resolution and color depth.

Low resolution, e.g. 800x600x16 is recommended for earlier video cards, 1024x768x32 and higher should only be used on newer cards.

This setting has the greatest effect on quality and frame rate.



Windowed/Full Screen - Switches the main game display between windowed or full screen mode.

Only full-screen mode is currently recommended.

Attempt Stencil Buffer - Utilize stencil buffer.

The Stencil Buffer is used to switch over to translucent shadows, etc.

It mostly works in 32-bit modes. It usually produces a dramatic drop in the frame rate on a number of older video cards. Recommended for GF3.

Apply - Apply new settings and return to the previous menu.

Back - Return to the previous menu.

4. Video Settings - Graphic Settings.

This dialog box is used to define quality and efficiency. The result of the settings depends on the video settings in the IL2 Setup (i.e., maximum quality is achieved with maximum video settings and when your video card supports a maximum number of options).

Simple - Move to simplified settings

Very Low/Low/Medium/ High/ Excellent Settings - Choose between overall quality: minimum to maximum.

Apply - Apply new settings.

Back - Return to previous menu.

Custom - Go to detailed settings.



Texture Quality - Texture resolution. Influences the amount of memory taken up by textures and the game in general. You can also use texture compression to reduce the memory used.

Visibility Distance - Visibility distance for objects.

Objects Lighting - Quality of object lighting.

Objects Detail - Detail of object geometry.

Landscape Lighting - Landscape lighting and shadows from objects.

Landscape Detail - Landscape detail (forest/trees/terrain/geometry).

Cloud Detail - Cloud visualization distance (their complete shutoff can be blocked in network play).



SOUND SETUP



Once the installation is completed, a separate IL2Setup configuration program will start up. You can also use this program for a more detailed adjustment of hardware settings **(at your own risk)**.

The easiest way to adjust the sound is to choose from existing configurations. Please choose your sound card from the list. If it does not figure in the list, follow the instructions below:

If your card supports 3D sound hardware acceleration or you are unsure about it, choose **Minimal or Maximal settings**.

If your card does not support 3D sound hardware acceleration or you experience

sound-related problems, choose **No hardware acceleration** in accordance with the OS you are using.

If you want to adjust all the settings yourself, choose Custom settings.

The options in this dialog box reuse those in the game's sound menu (**see below**) with the exception of:

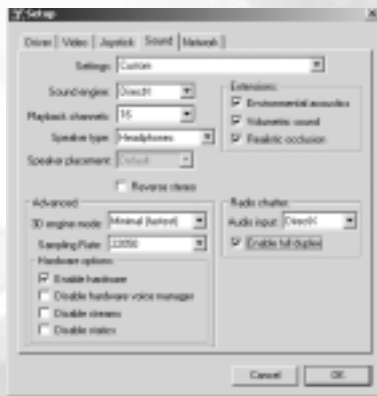
Disable hardware voice manager - select this option if you have an accelerated sound card and the sound occasionally fades away and disappears.

Disable streams - select this option if there are gaps in the sound. However, you will not be able to use the network telephone or listen to music.

Disable statics - select this option if the sound effects are out of sync with the image.

Audio input - devices used for the input of signals from the network telephone mike. DirectX required. "None" switches the telephone off.

Enable full duplex - this option should be selected.



MAIN IN-GAME SETTINGS

Adjusted in the **Sound Setup->Audio menu**. This menu is used to adjust the main sound settings.

"Sound engine" switch

If you have a sound card based on Aureal Vortex chips, use **Aureal3D**. In all other cases, use **DirectX**. To switch off the sound, use **Disable sound**.

Caution! If you have switched on the A3D mode and your card uses a chip other than Aureal, the game will most probably hang up.

"Enable hardware" switch

If your sound card has hardware acceleration, flick the switch on. This enhances the sound quality considerably and reduces CPU load. If there is no acceleration, the position of the switch is irrelevant. Should any sound-related problems occur, the switch must be turned off.

"Playback channels" switch

If your sound card has no hardware acceleration or if the hardware acceleration has been switched off with the **Enable Hardware** switch, the parameter has a great effect on the CPU load. Use the **Default** or **16** values. We recommend that you use value 8 for Windows 2000 and NT.

"Speakers type" and "Reverse stereo" switches

Specify the type of audio device you are using: headphones, desktop speakers or system 5.1 (surround).

If the stereo channels seem to be reversed, use the **Reverse Stereo** switch.

Advanced Menu



This menu is used to adjust additional settings. The **Audio quality** and **3D rendering performance** settings determine the ratio of sound quality to the rate of CPU load; the other settings affect the sound.

The **Audio quality** and **3D Rendering performance** switches affect the sound quality and for the most part the CPU load. The optimal **Audio quality** value is **22kHz**.

The value of the **3D Rendering performance** only applies if your sound card has no hardware acceleration or if the hardware acceleration has been switched off with the **Enable Hardware** switch. In this case, CPU operation is fast when the switch is at the Minimum position; CPU operation is correspondingly slow if the switch is at **Maximum**. It is recommended that you use the **Default** or **Minimum** values.

The **Distance attenuation** regulator sets the rate at which the sound volume decreases, if the distance to its source is increased.

The **Environmental acoustics** switch enables the use of EAX or A3D virtual acoustics interfaces, if they are supported by your sound card.

The **Volumetric sounds** switch activates 3D sound sources using Sensaura technology (it should be mentioned that with the current Sensaura driver version - 2101 - this technology does not work very well).

The **Realistic occlusions** switch determines whether the obstacles (for example the hull of the aircraft) will reduce the sound volume. If it is switched on and you are inside the aircraft, it becomes more difficult to distinguish the sounds from the outside. If your card supports EAX or A3D, you should flick the **Environmental acoustics** switch on. You can use the other two switches at your discretion.

Adjusting sound volume

Sound volume is adjusted using the corresponding controls in the **Sound Setup->General** menu:

Master volume - general level of volume for all sources.

Objects volume - relative effects volume.

Music volume - relative music volume.

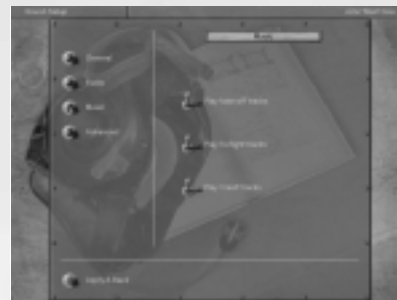
Voice volume - relative volume of voice messages and network telephone.

Music playback

Music in the game is activated via the **Play music** switch in the **Sound Setup->General** menu.

The music volume is adjusted using the **Music Volume** control in the **General** menu.

Whether the music is to be switched on or off in a given gameplay episode is defined in **Sound Setup->Music** menu.



Play take-off tracks - play music during take-off.

Play in-flight tracks - play music in flight.

Play crash tracks - play music when damaged.

You can add music files at your own discretion via Samples/Music/directory. The music should be in Windows WAVE-file, MPEG 1.3 format. The files for playback are chosen at random.



Network voice communication is activated using the **Voice Communications** switch in the **Network** menu. It starts working when you subsequently enter the next LAN or Internet game. The volume is adjusted using the **Voice volume** switch in the **Sound Setup->General** menu.



The channel for communication is chosen in the chat window. Only players using the same channel can hear each other. If you enter "." (dot) in the text box window, a list of channels will appear at the bottom of the screen. You can use this list to select the working channel by pressing the UP and DOWN arrows or by entering its number. The list gives the channel number and name. The number of players switched on to the channel is indicated in brackets. The current working channel is highlighted in a different color, and has a "*" symbol.



If you are experiencing problems of any kind related to network voice communication, make sure the following settings are chosen in the separate il2setup.exe program, **Sound Setup** section:

"Advanced" group
Disable streams - deselected.
Disable static - deselected.

"Radio chatter" group
Audio input - "DirectX".
Enable full duplex - selected.

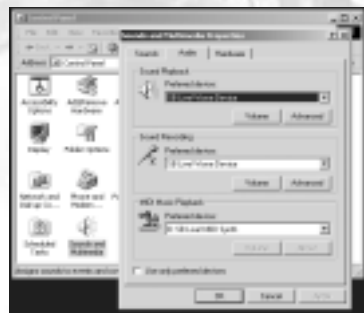
If the game does not run well with active voice comms, these can be switched off by choosing **Audio input** -> None in the il2setup.

Adjusting the sound in Windows

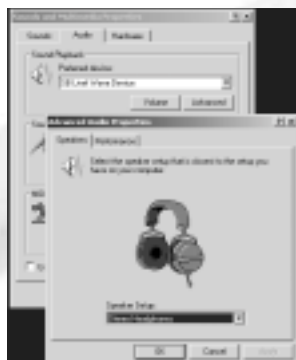
DirectX sound settings in Windows can be found in the **Control Panel->Sounds and Multimedia->Audio** dialog box. Sounds and Multimedia may simply be called Sounds in some versions of Windows

To adjust the sound hardware acceleration, choose **Sound Playback->Advanced** (see below).

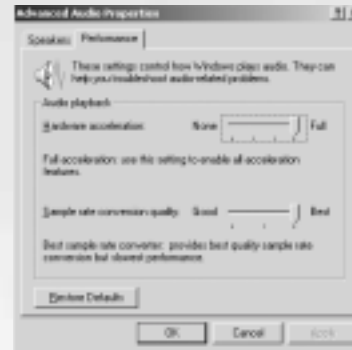
If you have several sound devices installed (for example, a chip on the motherboard and a separate card), choose the one you prefer in the **Preferred devices** list and select the **Use only preferred devices option**.



In addition to this dialog box, your sound card may have additional adjustment options.



Choose the sound device you are using in the **Speakers** dialog box.



Choose the Hardware acceleration->Full position of the switch in the Performance dialog box. If this creates problems with the sound, select Basic acceleration or, as a last resort, Emulation only.

Troubleshooting

No sound.

Make sure the sound is not switched off in the **Sound Setup->Audio** menu.

Make sure the volume is not muted in the **Sound Setup->General** menu.

No music.

Make sure the volume is not muted in the **Sound Setup->General** menu and that the music is selected in the menu.

Make sure, using the il2setup program, that the **Disable Streams** option on the **Sound** page is not switched on (to see all the components on the page, you should install **Settings->Custom**).

No network voice comms

You can hear messages of other players in Windows NT4.0, but you cannot talk yourself in most cases. This does not hold for Windows 2000.

Make sure your telephone is switched on (see above).

Go through all the options in the **No music** paragraph.

JOYSTICK SETUP

The game generally supports a vast range of basic joysticks by different manufacturers. Select **Use Joystick** in the setup program. Press the **Properties** button and make sure that the Joystick drivers have been installed and work correctly with your Joystick. If the setup program detected your joystick's Force Feedback feature and displays it, you can enable or disable this feature. Read about other features and the control settings in the **CONTROLS** section of this manual.

4 TUTORIAL

If you are already familiar with the basics of flight – either from real life experience, or from playing other sims, you can skip this chapter completely. However, don't subsequently complain that you haven't been informed about something particularly crucial! And as for the rest of you, just read on to find out what this flying business is all about!

1. Flying Essentials

At this stage in history we are all used to the sight of planes soaring above us. But do you actually know how aircraft manage to get up in the air and stay there? Well, if you're not entirely sure about the answer to that one, there's no need to panic - we won't be smothering you with a load of old formulas from physics classes, which by now you've probably forgotten anyway. What you should know, however, is that the interaction of a number of forces has a key part to play in the whole wonderful business of flying. These forces are as follows:

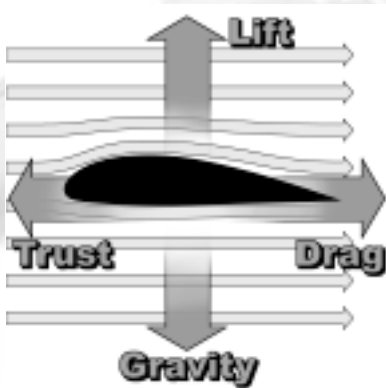
Thrust – the force that pulls an aircraft forward.

Drag – the resistance of the environment that has to be overcome by thrust, before a body can engage in any sort of movement (sound familiar at all?).

Gravity – the force which would just love to keep every single object on this earth (plane or no plane!) fixed very firmly to the ground; and, finally,

Lift – This is generated when the air pushes the plane upwards because of the specially formed wings.

If a plane has enough thrust, it can overcome drag and start moving. Once sufficient speed has been attained, enough lift will build up at the wings to defy gravity and allow the plane to take off. Simple, isn't it? In reality things are a little more complex than that, but we'll leave it there for the moment.



2. A Plane's Axes of Movement

Unlike ground vehicles, a plane can move in an extra direction, or, if you prefer, an up and down dimension. It can even be argued that a plane can move in TWO extra directions, even though both types of movement concern the same direction. These additional movements are pitch and roll – more on them later.

Movement along a plane's three different axes are made possible via special flight control surfaces, which a pilot operates via the stick and the rudder pedals. There are different names for the various movement options, and you should make sure that you take careful note of these, as they are extremely important for making sense of the chapters that follow.



Movements around the plane's roll axis are carried out with the so-called ailerons. They cause the plane to revolve around the direction where its nose is pointing, and allow it to perform turns. This movement is known as 'rolling' (not to be confused with the 'taxiing' the plane on the ground). To move the plane around the roll axis, the pilot moves the stick in the desired turn direction, which can be either left or right.



Turning movements around the yaw axis are known as 'yawing' and are carried out with the rudder. A plane responds to this exactly like a car responds to the steering wheel. Even more like a car, a plane is also steered via the rudder when it is on the ground; on modern planes the rudder is connected to the steerable landing gear, for example. Left rudder allows the plane to be 'yawed' (turned) to the left, and, logically enough, right rudder enables yawing to the right.



Movements around the pitch axis allow the plane to ascend or descend. This is known as 'pitching'. You pull the stick back to pitch the plane upwards, and push the stick forward to carry out a downward pitching movement.

Positive and Negative G-Forces

G-forces start to take their toll as soon as you start to carry out maneuvers at high speed and with quick direction changes. The 'G' stands for gravitational and '1G' is the basic force of attraction exerted by the earth. If you fly a tight high-speed turn, the drag involved means that your body cannot keep up with the rapid movement, and you will be forced into the other direction by a multiple of the force of attraction. If the level of G-forces becomes excessive, you can even experience a blackout, which will eventually lead to loss of consciousness. Trained jet pilots can put up with 9G for short periods of time with special equipment, but it's not exactly their idea of fun!

You can experience the effects of negative G-forces if you force your aircraft downwards at high speed out of level flight. You will be practically lifted out of your seat and will be weightless for a short while. If you take things too far, you will have a (literal!) rush of blood to the head and become rather red in the face, to say the least. Your body can deal with positive G-forces better than with negative ones.

When playing IL-2, if your screen goes black in mid-flight, this probably has nothing to do with your graphics card, but with the effects of excessively high positive G-forces. G-forces can be turned off in the 'Difficulty/Realism' menu.



3. Basic Flying Maneuvers

Takeoff

Now that you know which instruments are really important (please take a look at the reference card - the main indicators are Altimeter, Climb, Artificial Horizon, Turn, Course), you could start thinking about getting your plane into the air! And while you're at it you can ponder over the fact that the planes of this era were, for the most part, equipped with a small wheel at the rear - the tail wheel. Unfortunately, this meant that the plane's nose was raised in front of your cockpit, and therefore these planes had a very poor view (if any!) of the ground in front when taxiing and in the first part of take off. Try to compensate for this by looking out of the side of the cockpit and using the edge of the runway for orientation. And there's no point in moaning either - that's just how it's done, ok! Of course, you could always make things nice and simple and switch to one of the external views using either the F2 or the F7 keys.

Once you have lined up on the runway you should proceed as follows: extend the flaps to Takeoff level (F key twice). Start to accelerate slowly and check the tachometer to see whether or not the engine is reacting to your movements on the throttle. Now push the throttle lever all the way forward. As your aircraft gains speed, you may have to compensate for the engine's torque by gently applying the rudder. Make sure you keep a close eye on the turn indicator during this process! To begin with, you should keep the stick held towards you in order to exert pressure on the tail wheel and thus prevent a premature takeoff. Once you have attained sufficient speed, press on the stick slightly so as to lift the tail wheel off the ground. Don't press too hard or the propeller may touch the ground (if you are flying the P-39 Airacobra, forget everything we said about the tail wheel: the P-39 already had the tricycle landing gear which is standard nowadays).



The aircraft should now build up speed quickly. Once you have reached an adequate speed, draw back the stick gently. Make sure you don't pull too strongly and do not try to make a sharp turn straight away. This could result in the plane stalling and you will not have enough space beneath you to put this right in time. First retract the landing gear (G key) and then the flaps (V). Monitor your speed closely, and do not pull your nose too sharply right away. Let your airspeed get at least above 180-200

km/h, then start climbing and make sure that you keep gaining speed and altitude. Once you have reached your desired height, throttle back so as not to overburden the engine and adopt a level flight attitude. Many congratulations - you're flying!

Climbing

To get the aircraft to climb, simply increase the throttle! You will start moving more quickly and thanks to the increased flow speed of the air moving over the wings, more lift is generated. The more impatient flight simmers amongst you may be tempted to simply pull the stick back. The more you pull, the steeper the plane will climb upwards. A glance at the airspeed indicator will suffice to confirm that you are losing speed at the same time. Lower the nose a little so as not to slow down too much, but make sure that it remains above the horizon. If you are lucky enough to be sitting in a luxury cockpit, you may find an artificial horizon with which you can control your angle of ascent. An incline of about 20° generally represents a good compromise between your climb rate and your airspeed.

Stalling

If you get carried away with pulling back the stick, your speed will ultimately drop to an unacceptable level: the airflow over the wings will reduce and you will soon find your plane lacking the necessary lift to keep you in the air. You have stalled the aircraft, gravity has regained its grip on you and the next stop will be a rather premature reunion with mother earth. In a situation like this, though, panicking is the very last thing you should do: simply center the stick and let the plane go. Don't carry out any steering operations at all - these are pointless in a situation like this anyway. The nose should be pointing down towards the ground and the aircraft will be dropping rapidly in much the same direction. As this happens, the plane will regain speed, causing the control surfaces to react again. Once you have reached sufficient airspeed, bring the plane out of its fall and return it to level flight. Do try this maneuver out, as you will probably find that you stall at inconvenient moments (like in the heat of battle, for example) and so a certain amount of practice in a non-critical situation will pay off. But do please make sure that you always have a sufficient amount of space between your plane and the ground before you embark on a training session...



Spins

If you are really unlucky, you may find that your plane doesn't just stall, but also goes into a spin. Spinning means (amongst other things) that your plane keeps rotating uncontrollably around its roll axis. A spin occurs when a stall has affected only one wing, in an excessively tight turn for example. Rescuing a plane that has gone into a spin is considerably more difficult than righting an aircraft that has merely stalled, and sometimes this is simply not possible. The first thing you have to establish is the direction in which the plane is rotating around the roll axis. If you can't identify this, you should have no reservations about switching to an external view via F2 or F7.



Once you have determined the direction of the spin, you can try your luck and have a go at the rescue operation. Move the stick into a neutral position. Under no circumstances should you operate the ailerons, that's to say by moving the stick to one side or the other - this would only make the spin worse! Instead you should step on the rudder in the opposite direction to the one in which the plane is spinning. After that it's just a question of waiting until the plane stops spinning. If you can't see any improvement, your best bet is just to try again. If the plane has actually stopped spinning then your battle is almost over: all you have to do then is to wait until the plane has picked up sufficient speed for the control surfaces to start reacting again. Then you can put an end to the dive and return to normality! Well, it's certainly worked before....

We hope that you will notice to your dismay just how much height you have lost. If you do happen to fall into a spin at low altitude, time really is of the essence and you should bail out without further ado (CTRL + E). Then again, you may find that the maneuver described above doesn't actually achieve anything. In some cases you may even have fallen into a flat spin, a particularly unpleasant variety in which you find yourself spinning around your yaw axis. Rescuing an aircraft which has fallen into a flat spin is very nearly impossible, and abandoning the plane to its fate via CTRL + E is by far your best option.

Level Flight

Sounds wonderfully simple, doesn't it? Which is true for the most part, at least once you have grasped the basics of this skill. Level flight involves flying straight ahead without changing altitude, with all the forces which act upon the plane in balance. This balance means that the plane can fly in a straight line more or less of its own accord, without too much intervention from the pilot. Ok, we said this is relatively simple, but that doesn't mean that an aircraft can just adopt this mode without any help on your part! Depending on the load on board (weapons, fuel, personnel etc.) the plane's center of gravity changes, which in turn has an effect on the flight attitude.

You can, and indeed should, counter these factors by adjusting your aircraft's trimming. This involves fine-tuning the control surfaces to enable a constant, balanced flight attitude. If your plane is dipping to the left slightly, for example, this is not necessarily due to any movement of the stick. Instead, trim the plane to make it lean to the right by holding down the 'CTRL' key and pressing the right arrow key until you have fully countered the lean to the left. If, on the other hand, the plane is inclining upwards, you can try to counter this tendency by simply easing off the gas slightly. Less thrust = less speed = less lift - remember? If that doesn't work, trim your plane by using the CTRL and down arrow keys to make it slightly nose-heavy. Feel free to experiment a little with the trimming and do make sure that you are familiar with the key commands involved (chapter 6).

Turns

To turn the aircraft, you first have to bank it around the roll axis - in the direction in which you wish to turn, logically enough. To do this, gently move the stick in your chosen direction until you have reached an angle of about 20 - 25°. And that's enough for the moment. The plane will describe a gentle curve, moving the nose down slightly in doing so. You should therefore gently move the stick back so as not to lose too much height. Gently use the rudder and keep a very close eye on the turn indicator: if you want to become a really good pilot, your operation of the rudder should cause the ball in the indicators spirit level to move as little as possible, remaining in the center of the display. This sort of a turn is known as a coordinated turn: the plane is not forced to one side but follows the radius of the curve without lurching to the side. And do bear in mind that although your stick may return to a central position of its own accord, in order to return to level flight you will have to steer it into the opposite direction yourself.



Controlled Descent

'You always get down eventually,' so the saying goes. Which is true enough in itself,

but you have to remember that there are all sorts of ways of getting your feet, and your plane, firmly back on the ground, some of which are a good deal safer than others. If you just point your plane's nose at the ground, you will gain speed - an awful lot of speed. You will certainly be traveling too fast for the majority of planes from the Second World War period. On your way down you are likely to feel a little bit shaky, and then it won't be long at all until the first parts are doing their own flying around you. Try explaining that particular strategy to your mechanic if you are still able to!

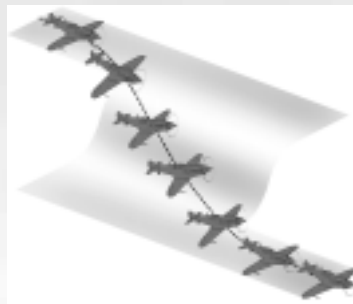


You should always ensure that you prepare for your descent and landing carefully. The first thing you should do is to decelerate. The plane will embark on a gentle descent due to the reduction in thrust resulting from its lower speed. Check this by taking a look at your rate of climb indicator. Then press the stick forward slightly, all the time keeping the airspeed indicator in view. Depending on the type of plane you are flying, there is a varying range of speeds which can be flown safely at this stage. If you are flying too fast,

simply reduce your angle of descent and gently pull the stick towards you.

If your cockpit has an artificial horizon, check your flight attitude if you're not totally sure that you can rely on your instincts.

You can also try flying broad descending curves, as you automatically slow down when banking. You should always watch your speed very carefully during this procedure, or you could run the risk of stalling.



There is one handy trick which can help you to lose altitude without speeding up: gently roll the plane to one side and at the same time counter this movement with the rudder so that you don't actually turn. This will mean that you are flying at a slant, but this will be useful in your descent. This maneuver is known as a 'slip' or 'side-slip', and was invented by WW1 pilots to compensate for the fact that their planes were a good deal more fragile than the ones you will meet in IL-2 Sturmovik.

If you and your plane are of a robust constitution, you can use the so-called 'Split-S figure' explained in section 5.4.3. This will expose you to high levels of G-forces, so don't say you haven't been warned!

If you need to get down to the ground fast, like in case of crash-landing after battle damage, chop your throttle to idle and drop full flaps. Point your nose downwards, which will take more strength than usual as the flaps will generate excessive lift. Keep your nose down to still allow for your airspeed to drop. Once at speeds below 300 km/h, drop your gear - then level out as close to the ground as you can and continue flying forward at a very shallow angle until you touch down.

4. Key Air Combat Maneuvers

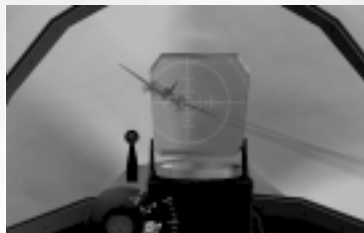
If you have studiously digested the previous sections and taken the advice contained there to heart, you should be in a good position to perform clean takeoffs and landings and to squeeze in a few nice, coordinated turns in between. All this is, of course, admirable, and we are extremely proud of you! But we trust that you won't be too crestfallen when we tell you that these skills alone are not enough to make you into a flying ace. It may be of some comfort to hear that you are not alone in this regard. Many of the world's most famous aces had to put in many a long hour of practice, learning from their mistakes all along before they were able to acquire the talents which set them apart from less successful or merely average pilots. And then there are just some things which can probably never be learnt: abilities which you either have or have not got. For more on this topic, take a look at section 5.5. Don't start turning the pages just yet, though - first of all we're going to introduce you to the key maneuvers of air combat.

4.1. Offensive Maneuvers

"you have to get up to a distance of about 70 meters from the target before you can open fire. A big mistake which is often made lies in losing speed when you move up to shoot at the last minute. This doesn't work - the distance simply gets bigger and bigger and you can even lose touch with the target completely. If you shoot from too great a distance away, you just let the enemy know where you are because of the trail your shots leave, and the enemy can frequently get away. Another frequent error lies in gaining ground on the enemy too quickly and then not being able to brake in time, which means that you end up in front of the target.

John Cunningham, R.A.F. night fighter pilot.

Quote from: Sims, Edward H.: Fighter Tactics And Strategy 1914 – 1970.



If you will permit us to make a very broad generalization, air combat maneuvers can be divided into two categories: offensive and defensive maneuvers. An offensive maneuver, in a one on one air battle (also known as a dogfight), for instance, focuses on shooting down the enemy as quickly as possible. This generally involves taking an opposing pilot completely by surprise (the ideal situation!) or

outmaneuvering him to such a degree that you a) get into a good firing position and b) stay out of trouble as much as you can. As is often the case, theory is considerably easier than practice here. But with a little of the latter you should be able to achieve a certain amount of success before too long.

Hammerhead

This maneuver was known as "Immelmann" in WW-I, named so after a famous German ace Max Immelmann. Whether he was really the first pilot to carry out this maneuver is open to question, but what is beyond doubt is that he could perform it to perfection. However, since then the terms changed and Immelman in WW-II is something completely different.

A typical hammerhead involves flying the plane straight up in the sky until shortly before a stall, then using full rudder to carry out a 180° turn about the yaw axis and subsequently going into a dive. The point of this piece of aerial acrobatics is to enable you to tuck yourself in behind an aircraft which was flying in the opposite direction to you before you carried out the maneuver. To execute it to perfection you will need good timing and a good reserve of speed to be able to carry out the steep climb at the beginning.



Make sure you are flying at an adequate speed to begin with. If need be, lower the planes nose to pick up a little extra speed. Gently but firmly, pull your plane around so that it is climbing straight up. Don't lose sight of your airspeed indicator! Before you lose too much speed and therefore stall, step on the rudder pedals. Do we really need to mention that you should by now have decided which way you're planning to turn? Good, we knew that wouldn't be necessary. Then turn the plane through 180° so that the nose is pointing down to the ground, gently using the ailerons as you do so. Pay careful attention to your course indicator or a compass – if everything has gone according to plan you should now be pointing in exactly the opposite direction from the one in which you started. At the same time you should also pick up speed. Recover the plane from the dive once you have reached your desired altitude. In combat situations you should aim to end up slightly beneath the enemy aircraft, thus putting you out of the range of any gunners on board and with any luck you won't be detected by enemy pilots.

Immelmann

These days the term 'Immelmann' is generally used to refer to a maneuver also known as a 'half-loop'. This also involves trying to change the planes direction by 180 degrees in as little time as possible, but the pilot achieves this in a different way, flying an upwards half loop instead of the maneuver described above.

Before you begin an Immelmann, you should again make sure that you are traveling at sufficient speed, as you will need to be moving fast to accomplish the maneuver that follows. Keep the wings nice and level, pull back on the

stick and move your plane upwards. While you are climbing you should roll to one side slightly – again, you choose which side. Keep pulling back on the stick until your plane is flying in the opposite direction to the one in which you started. While you're doing this you should keep a close eye on the course indicator or the compass. Using the ailerons, turn the plane around the roll axis until you are flying in a normal flight attitude once again. You will now have gained altitude and will gradually be picking up speed again, flying in the opposite direction to the one in which you started.



Loop

This well-known maneuver is perhaps the least useful of all in combat – at least that's probably the answer you would get if you could still ask Manfred von Richthofen, the famous 'Red Baron', for his esteemed opinion of looping. Some pilots, however, just cannot get enough of this tactic. There are indeed good reasons not to carry out this maneuver during an air battle, particularly because it takes a good deal of time and also requires sufficient speed and altitude to complete a loop fully. However, you should certainly be acquainted with this particular trick, if only so that you know how to react should an opponent in front of you decide to try it out himself.



Sufficient speed is essential before you can think about attempting a loop. If required, lower your plane's nose a little to gain speed. Pull the plane up into the sky with its wings level. Keep the stick pulled towards you and just wait until you are traveling in your original direction again. That's it – it's as simple as that! Oh yes, to be on the safe side and make sure that you describe as good a loop as you can, you may find the following trick useful: look out of the cockpit to one side and keep your eye on the wing tip. If you get everything right, the tip will describe a perfect circle. Then again, beauty alone doesn't count for all that much up in the sky...but it won't be long before you find that out for yourself anyway!

Yo-Yos 1: High and Low Yo-Yos

"The Yo-Yo is very difficult to explain. It was first perfected by the well-known Chinese fighter pilot Yo-Yo Noritake. He also found it difficult to explain, being quite devoid of English"

Squadron Leader K.G. Holland, RAF. Quote from L. Shaw's "Fighter Tactics".

These flying configurations may well have amusing names, but the idea behind them is deadly serious. They are offensive maneuvers which are geared towards the fact that in air combat it is only very rarely the case that you will be up against an equivalent opponent in terms of identical performance data. To put it simply, never expect to be able to just fly behind your adversary and thus automatically find yourself in a good firing position.



He could well have a much more easily maneuverable, quicker plane. Or it could be the other way round and the (apparent) advantages could be on your side, which unfortunately doesn't necessarily make things easier. If you perform a yo-yo maneuver correctly, you can manage to sneak in behind the enemy directly despite the difference in speed or turn performance. And that in itself is very often half the battle!

A low yo-yo is a suitable option if the opponent flying in front of you is quicker than you are, as it may enable you to catch up with him and attack him.

Gain speed by allowing your plane to descend. This also takes you underneath your adversary, whose view of you will then be impaired or even obscured completely. Once you have been able to get close enough and the enemy is almost directly above you, pull your aircraft right up. You should have enough surplus speed to be able to get into a firing position before your plane slows down too much and perhaps even stalls.



Yo-yos 2: High and Low Yo-yos: Banking

A yo-yo maneuver can also be deployed during banking in order to stay behind an adversary whose plane is more maneuverable than yours. Again, the trick here lies in using space as efficiently as you can in order to make up for any comparative disadvantages which your plane may have.



Pursue an adversary flying ahead of you and turn at the same time as he does. But instead of trying to follow him directly, pull back on the stick, thus lifting you above your target for a moment. Watch out though: you will probably lose sight of him temporarily. Now roll your plane into a slightly tighter turn, thus moving yourself more sharply into the radius of your opponents turn. When he has turned a bit further, you will be able to use your height advantage to pounce on him from above and should land right behind him – if you've got all your sums right, that is!



Follow the opponent ahead of you into the turn, and push forward on the stick to make your plane descend. Cut back on the throttle so as not to gain too much speed. Then fly a longer distance before cutting into your enemys tighter turn radius. Pull back on the stick as you are doing this, lifting your plane straight up. With a little practice you should land right behind your enemy and thus in a good firing position.

The thing is, theres no real difference between low and high yo-yos that can be easily explained. Both can be used in the same situation, often with the exact same end result. In both you dive and climb, just in different order. It can be argued that you turn better in a high yo-yo as your plane spends more time at lower speeds – but this is all a matter of individual planes characteristics. The truth is, turns are almost never perfectly horizontal in combat. If their opponent is climbing, pilots tend to counter with high yo-yos. If an opponent is diving or is generally below, a low yo-yo is recommended.

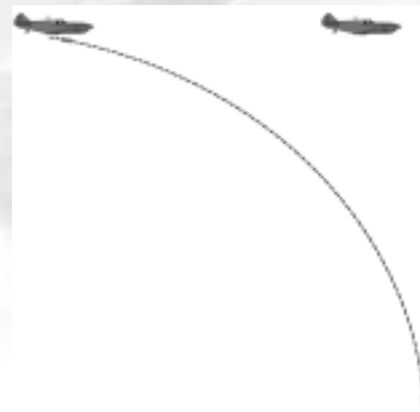
4.2 Attacks on Ground Targets

Right, thats enough about dogfights. In IL-2 Sturmovik, attacks on ground targets play a particularly important role, and the rules for this type of combat are somewhat different. Attacking ground targets is all about trying to score a direct hit in as few attempts as possible whilst remaining in one piece. As you can no doubt imagine, the enemy won't exactly welcome your attacks with open arms, and being able to counter his defenses is of prime importance.

Bombing from High Altitudes

To try and escape fire from ground objects such as tanks, artillery and flak, you can opt to release your bombs from high altitudes. This strategy certainly helps to protect you, but is, unfortunately, relatively imprecise, requiring a high degree of skill and practice to be truly successful. What makes dropping bombs from such great heights so difficult is the speed which also has to be considered: your bombs won't just drop to the ground in a straight line, but will cover a certain distance in flight depending on the speed at which you were flying when they were released. Large bombers have a bombardier to direct the bombs and release them, but in an IL-2, for instance, you have to take on these duties yourself.

Why not try this out for yourself? Once you have identified a target, fly towards it at high altitude. As you're making your way towards your goal, you may wish to switch to an external view using the F2 or F7 keys. To hit the target you will have to release the bombs a long way before the point at which you actually fly over it. Have fun practicing!



Dive-Bombing

To improve the accuracy of bombing missions, dive-bombing tactics were developed after the First World War. The idea behind this strategy is to plunge down on to the target in nearly a straight line, so that there is almost no horizontal distance between the target and the plane when the bomb is released. This release technique was developed by the US Air Force and adopted by the German Luftwaffe, which ultimately led to the development of notorious aircraft such as the Junkers Ju-87 and Ju-88, which were specially adapted for this type of bombing. But thats another story...

To release a bomb in a dive maneuver, approach your target at an adequate altitude. Once you are almost directly above the target, embark on a sharp descent (a dive) and speed towards your target as directly as you can. You are vertically above your target if it remains in the center of your sights and simply seems to rotate even when you are moving your ailerons. As for when you actually release the bomb, you should ensure that you give yourself enough time to fly to safety. Be prepared for defensive fire and take care, as by no means every pilot (nor every plane, for that matter) can withstand such high speeds for long.



It is a good idea to use anything you can to slow your plane down during a dive attack – flaps, dive brakes, anything you may be equipped with. Don't forget to idle your engine when diving, too!

Pick out a target and get it into view. Try to fly as quickly as possible to make yourself as hard a target for enemy fire as you can. Unfortunately you can't swerve

or dodge around that much, as your weapons are simply not modern enough to seek the target themselves. When choosing the moment to drop the bombs, bear in mind the distance which they will travel after being released. Then climb up and away from the target without delay to avoid falling victim to your own bomb. Now focus on continually changing your height and direction to make it as difficult as you can for the enemy to shoot you down. An IL-2 is, admittedly, well armored, but is by no means indestructible! Switch to an external view to take a look at the effects of your handiwork or fly a course which enables you to look out of one side of the cockpit down to where your bombs landed. Don't be at all surprised if the first attempt was a failure – you will almost certainly have to make a few practice runs before you score a direct hit.



Rocket Attacks on Ground Targets

Almost all versions of the IL-2 are equipped with suspension rails for unguided rockets as standard. What unguided means in practice is that, as we saw above with bombing tactics, you have to direct the plane towards the target directly if you want to achieve a hit with your rockets. And, of course, in doing this you provide the enemys ground forces with another wonderful opportunity to get in some target practice. So when mounting rocket attacks you should again try to move as quickly as you can with an approach at low or medium altitude. Train your sights on the target and release the rockets from an appropriate distance (not too far away). Bear in mind that your rockets are positioned to the left and right of you underneath the wings and that they will not necessarily land right in the center of your sights. Once you have fired off the rockets or the rocket salvos, start climbing again and turn away, swerving and changing your altitude as much as you can so as to escape enemy fire.



Using On-Board Weapons

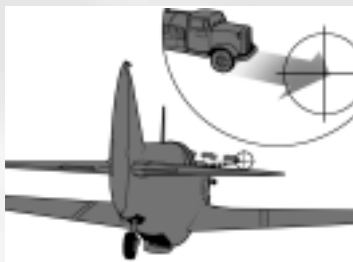
The IL-2 has impressive canon and machine gun capabilities fitted as standard, and so does the German FW-190. But the Messerschmitt Bf-109 can also be equipped with powerful additional weapons (which can also affect the planes mobility). Attacking ground targets with on-board weapons is basically very similar to using unguided rockets. Set your sights on the target and fly towards it at high speed. Given that the shots from your on-board weapons are not nearly as destructive as rockets, for example, you will probably have to land a number of hits to destroy or perhaps even just damage a target. Take a very close look at what sort of target you have in mind. You can possibly finish off a truck or a locomotive with just a few hits on target, but if you have set your sights on a heavy tank, you will have to be pretty accurate with your aim and score a direct hit! The colored tracer bullets can help you with your aim – adjust the direction you choose accordingly. In later models of the IL-2 the machine guns were,



curiously enough, only included for the purpose of making targeting easier for the far more effective machine cannons! If you move the rudder slightly to the left or right while firing and turn gently around the yaw axis, you will manage to spread out your shots more effectively and raise your chances of a hit.

Deflection Shooting

If you try to shoot at a moving target, you will probably notice the following: let's say that you approach a truck - which is traveling in front of you - from behind and slightly to the side. You've got him right in the center of your sights and press the trigger, but you still don't hit the target. The reason for this is simple - even though your bullets are extremely quick, they still have a certain distance to travel before they arrive at their destination. They will actually hit the place that you have lined up for them, but by the time they make impact the truck will have traveled a little further itself - to cut a long story short: you missed! Of course, you may actually end up hitting the target, but if this is the case then you have probably aimed at a particularly slow specimen of the truck species!



The bottom line is that you should always consider the distance which the target is likely to cover before the bullets arrive and bear this in mind when taking aim. So it is wise not to train your sights on the target itself, but on a point slightly in front of it. To summarize, the faster the target is moving, the further you have to aim in front of it. This is known as deflection shooting. As you can imagine, this is by no means a technique specially developed for attacking ground targets. In truth, you're not likely to score many hits at all in any sort of battle if you don't start putting these principles into practice. Even top aces can be driven to despair by this fact, if that's any consolation. But once you have grasped the underlying principle, a little practice should help you to put this technique to good use.

4.3. Defensive Maneuvers

"...by the way, did you know that the Russian Rata could outmaneuver the Me 109?"
Joseph Jacobs, Commander of the Jasta7 in Flanders in the First World War.

Quote from: Sims, Edward H.: Fighter Tactics And Strategy 1914 - 1970.

Now that you've read so much about all the lovely damage you can do, it's about time we told you that you're likely to find yourself in at least as many situations in IL-2 Sturmovik in which the enemy has got his sights trained on you! All is not lost, however - read on to find out how you can get yourself out of the tightest of corners and maybe even turn things to your advantage!

Break

Quite apart from the fact that it's always better to avoid getting into risky situations in the first place, any self-respecting pilot should be able to carry out this maneuver in his or her sleep. Fortunately it is really quite simple to perform, as a break is basically just a very tight turn. Use this maneuver if you've got the sneaky feeling (or if you're absolutely sure, for that matter) that the enemy is right behind you.



To perform this maneuver, roll your plane through 90 degrees to whichever side you choose and pull the stick towards you. You can also gently use the rudder and cut back the throttle to make the turn even tighter. If your plane is particularly maneuverable, this may well be enough to shake off your pursuer, as he will have to be at the controls of an even more nimble aircraft to get himself into a good shooting position. But be prepared to carry out a series of maneuvers to shake off your would-be assailant, as one simple break alone is generally not enough. Only the most suicidal pilot would perform a series of breaks in alternating directions. Rolling from one direction to the other may take a few seconds, during which your plane will be flying almost straight and level - enough for the attacker to regain any positional advantage he may have lost during your first break turn.

Barrel Roll

You can use this maneuver to help you confuse an enemy who is following you by flying in a tight spiral. If he wants to score a hit against you, your pursuer will have to follow you in this maneuver, otherwise he will fly past you or above you. A barrel roll may enable you to tuck in behind him and turn the tables!

Move the stick to whichever side you choose and pull back on it slightly. Your plane will start flying a long, narrow spiral. Keep following this route until your opponent flies past you. Of course, that's what we hope he'll do. If he manages to stick on your tail you'll have to think of another defensive maneuver to help you get rid of all that unwanted attention. Try using full rudder, in the same or opposite direction, during a barrel roll to make it even more unpredictable.

Dive

For this maneuver, it pays to have a thorough knowledge of your own and, if possible, also your opponent's machine. Let's say you're flying a Messerschmitt Bf-109 and you come under attack from a MiG-3 which is in hot pursuit of you ...



Placing all your trust in your own plane's robust stability and the correspondingly fragile nature of the Soviet pursuer, you simply point your aircraft's nose straight down towards the ground. You will pick up an awful lot of speed, as will your enemy if he decides to stick with you. You will be able to put up with this for quite some time before you really start to suffer, whereas your adversary will probably start to feel the effects much more quickly. If he has any sense he will abandon his attack completely or hang around for a better opportunity. Which means that you're in the clear...for the moment, anyway.

The Split-S

The Split-S is a downwards half-loop. This means that you gain speed while losing height. Ideally, of course, you will have plenty of altitude before attempting this maneuver, which also involves you adjusting your course by 180 degrees.

Quickly roll to one side until you are upside down and then pull back hard on the stick. Once you have completed a half loop you will have attained enough speed to make an attempt at flying away from the enemy.



We hope you appreciate that these are merely the most basic defensive maneuvers and that none of them offer a fail-safe method of saving your skin. But if you practice them and acquire a certain amount of proficiency in their execution, you will give yourself a good chance of holding your own in airborne combat. You should also try to combine several maneuvers, flying a Split-S straight after a break, for instance. Have a go at confusing your enemy or enticing him into a maneuver from which he will find it difficult to escape by using your aircraft's special characteristics to your advantage. Look and learn: watch your opponents in action and take note of their strategies for getting out of trouble.



In addition we strongly recommend you read the Introduction to Combat Air Tactics below.

It doesn't matter whether if you're a new pilot who has never pressed a gun trigger on a plane, or a seasoned ace with many kills in another flight simulator. If you follow these tips, you will achieve much better results in combat.

Introduction to Combat Air Tactics

A fighter pilot's goal is rather simple, and can be expressed by this short phrase:

To find enemy planes and to destroy them before they can do any damage

However, once you look deeper into air combat, you will realize that it's not that simple. The short phrase above actually assumes four things:

1. You notice the enemy in time
2. You can get into firing range
3. The enemy is destroyed by your gunfire
4. You live to tell about it

Each one of these tasks is a very complicated matter on its own, and all of them combined together make success in air combat a questionable matter, at best. Now let's look at each one of them in a little more detail.

Finding the Enemy

This is difficult, as your only instrument in finding the enemy is your own eyes. You have to be on a constant lookout for enemy planes, from the moment you take off to the moment you land.



"...we found ourselves in position behind and above the enemy. We split the schwarm up into two groups of two and dived down to attack. We shot through the fighters and then started to make life unpleasant for the schlachtflieger. I attacked the plane which was flying furthest to the left, moved in quickly and opened fire from 70 to 100 meters. I managed to score quite a few hits, but my shots just cannoned off the IL-2. Its heavily-armored body was even able to withstand 2cm cannon projectiles!"

Erich Hartmann

Quote from: Jäger, Manfred (1995),

Erich Hartmann – The Most Successful Fighter Pilot in the World, Motorbuch.



If you are going against enemy bombers, you must trade off surprise for speed. What good is coming in unnoticed when you gave the enemy time to drop bombs on their primary objective?

If you are thinking of attacking enemy fighters, or other planes that present no immediate danger to friendly forces, you can take your time and position yourself for attack as you please.

Destroying your Target



This is the most difficult part of air combat. Even the most qualified marksmen can miss a fixed target, lying on a ground with a scoped rifle. Now imagine firing at a small maneuvering target hundreds of meters away, while both you and a target are flying at 400 kilometers per hour. Its not impossible, but this is very hard.

Many young pilots return from their first missions with empty ammo stores, but never claim a kill.

Only constant practice, and utmost confidence can help you score your first combat kill.

Getting Out

The success of this task largely depends on how well you fared in the previous three.

If you missed some enemy targets in the first stage, you risk getting shot out of the sky by an unseen opponent. If you came in clumsily and ended up in a middle of enemy formation, you're as good as dead. And, well, if you missed your target when you fired at it – you have one more angry pilot to run away from.



Summary:



There is no skill more important to a pilot than gunnery.

All the aerobatic wonder moves in the world are of no use if you can't get a kill when the time comes. All that matters in combat is being able to get in quickly, shoot, and get out even more quickly.



If you can't destroy your target, you're no good as a fighter pilot.

Always look for the enemy!

Most pilots shot down never saw their victor! Whether you're by yourself or with a hundred others, never stop looking around!



Protect your Mates!

Whatever you do, destruction of enemy aircraft is always secondary to protecting friends. No enemy target is as important as the life of your mate!



Destroying your Target

There are two main segments within this task: maneuvering for the kill, and actually shooting the enemy down.

Maneuvering for the kill has been a subject of a great many thick books; we cannot possibly explain it in sufficient detail within this manual. However, the main principles remain simple: you must bear your guns on your target long enough to allow for its total destruction.

Remember, in actual combat, everything goes and you should **never hesitate to act on your hunch**, however unconventional it may be.

All tactics were invented by the pilots in the heat of the dogfight. A fighter pilot who does everything by the book becomes predictable, and therefore vulnerable. **Fight using your brains, and always improvise!**



Aerial Gunnery

There are many factors that work against you when you fire. First of all, your bullets don't fly in a perfect straight line. Your plane is shaking in the air, your guns recoil and twist, Earth's gravity pulls the bullets toward the ground, and the thick air slows them down. All of those things combine to create something called "bullet dispersion".



A bullet stream from one machine gun at 50 meters will fit into an area fifty times as small as the same bullet stream at 500 meters. This makes long range fire extremely difficult.

Keep in mind that bullets lose power over distance. Using the same example, a bullet at 50 meters can puncture light to medium armor, but at 500 meters it may even bounce off human skin.

Most targets you encounter will be armored. Some planes have armor strong enough to reflect any bullets or shells you fire; your ammunition will harmlessly bounce off your target without doing any damage.

However, no airplane has the same thick armor all over. Even the heaviest armored airplane has some weak spots, where just a few hits are often enough to bring it down.

Gunnery Practice Suggestions

- ✚ Set up flights of friendly bombers in the Quick Mission Builder. The larger your target, the better. The Pe-8 from the Soviet side is a great gunnery target, and the He-111 or Ju-52 make great German targets.
- ✚ Slow the game down with the [] key when you're getting ready to fire. This is very helpful in learning to aim and maneuver.
- ✚ After you find yourself hitting your targets easily in the exercise above, set up the same large targets as Hostile. Try shooting them down as they take defensive actions and fire back at you.
- ✚ Only after you're sure to destroy an enemy bomber, should you try to go against fighters. It takes a great deal of skill, patience and determination to shoot down an enemy fighter.
- ✚ Review the track of your flight afterwards. Analyze your performance, find mistakes and correct them in your next mission.



Know your Enemy's Weak Spots

Learn about the capabilities of all enemy planes: blind spots, defensive fire arcs, and performance relative to your aircraft. Only by smartly positioning yourself to set your strengths against enemy's weaknesses can you be most effective in combat.

When you Think you're too Close – Get Even Closer!

Bullet dispersion and power loss mean that long-range shots are ineffective, unless you're very lucky. Press the trigger only when sure to hit your target with every bullet in the burst! Since that is only possible from point-blank range, open fire when your target fills your whole windscreen.

Practice!

I wish that following these principles could guarantee you a kill every time you press the trigger. Unfortunately, it isn't so. Prepare to miss a lot.

Only by dedication and taking a steady, structured approach to training can you become a true ace.



As we said above, it's impossible to cover all aspects of aerial combat in a book, however large it may be. We will not attempt to do that; rather, we'll show some common situations and try to illustrate the most fundamental principles of fighter vs. fighter combat.

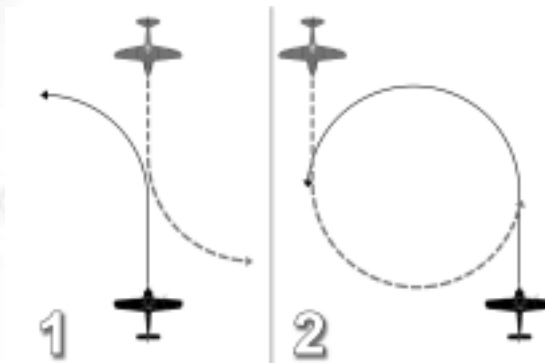
We will only cover 1 vs. 1 scenarios here. Multiple aircraft engagements are extremely complicated, and success in them is directly based on your ability to win 1 vs. 1 engagements.

The most important thing to a pilot is his airspeed. If you're slow, you can't maneuver well and you can't escape enemy attacks. The worst position for a fighter is low and slow, chugging along at tree-top level. When you're there, your only hope is that luck will be on your side.

So, at all times during an engagement, **climb!** This should become your strongest instinct, to gain altitude whenever you have a chance. **Stay above your opponent, and you will hold the initiative.**

We will assume the most common scenario: both you and the enemy notice each other at the same time from a distance, and are going straight for each other's throats. Correctly approaching during this stage is key in your future success or failure. No amount of skill can guarantee you a kill in a pure head-on pass, and we would not recommend leaving this to your luck. Committing to a head-on attack is like tossing a coin in the air to determine who gets shot down.

However, you can largely increase your odds even before the initial pass is completed. Look at this diagram, illustrating the importance of separation between your flight paths. In case 1, the two fighters approach head-on, and both choose to turn left. It will be at least two full turns before one can possibly get his guns on his target. In the second case, the fighters pass each other at exactly one turn circle diameter. This brings them on each other's tails very rapidly.



We therefore recommend the following approach path: fly straight towards your enemy. When you're about three or four firing ranges away, quickly break away until you're almost in range, and then turn back on a path parallel to your enemys. Of course, the flight path separation does not only need to be horizontal; it can be in altitude as well, or both.

You can increase your odds even better by executing something called a lead turn. Unlike in the first diagram above, a lead turn has you turning before you pass your opponent. If executed correctly, this can get you on your opponents tail in as little as half a turn circle.



After the first pass, everything's up to you and your opponents skill! Know your planes capabilities, and respect your adversary. If your plane turns better than the enemy, follow him in a turn and try to catch up with him as soon as you can. Everything goes: chop your throttle, drop your flaps, even your gear!

If your plane is faster than the enemy, climb away from him to where he can't follow you, and then dive down with your guns blazing!

Speed is life.

There is no more important principle in combat than this one.

Your first burst should be your only burst.

"Spray and pray", will only amuse your opponent. Make every shot count!

Always Watch Out!

Where there's one enemy, there's always more nearby! When you're lining up on that perfect pass, look behind you and check for your targets wingman!

Do you think you're getting there? Great – it's not all that complicated, is it?

What to Do in the Case of Damage

"The anti-aircraft guns fired at us fiercely from all directions, and suddenly I felt our aircraft hit. My left foot slipped down into an empty space below me, the bottom of the cockpit had been shot away. I felt something hot streaming down my left arm and leg – I was wounded. Blinded by the searchlights, I could discern nothing in the cockpit. I could feel moisture spraying inside the cockpit; the fuel tank had been hit. I was completely disorientated; the sky and earth were indistinguishable to my vision. But far in the distance I could see the sparkle of our regimental runway floodlight, and it helped restore my orientation. An air wave lifted us, and I managed to glide back over the river to the neutral zone, where I landed the aircraft in darkness."

Nina Raspopova, 46th guards bomber regiment.

in: Noggle, Anne (1994): A Dance With Death. Texas A&M University Press.



Sooner or later, it's bound to happen – unless, of course, you've activated the invincibility option in the Difficulty settings menu – you will be hit by enemy fire, by flak, machine guns or canons and your plane will be damaged. You will notice that maybe the steering isn't really working properly, that the engine sounds strange or maybe you'll even see black marks on the armor plating in front of you. There is quite a high probability that that really is your oil. At any moment, your engine could stop, burst into flames or even explode. What can you do? Well, that depends...

The first thing you should do is to get a clear idea of how serious the damage actually is and who it was who perpetrated this awful deed. It goes without saying that this analysis has to take place quickly, as an enemy fighter may be right behind you and moving itself into position. If this is the case then you have, unfortunately, already made the serious mistake of not paying attention! Try to escape your pursuer with defensive maneuvers if the damage to your plane allows. Perhaps you can swerve your way out of danger or even shoot your opponent down.

Whatever action you take, you should make certain that you pay close attention to your instruments, in particular to the displays for oil pressure, engine temperature and coolant. What do these displays tell you? Is the engine temperature rising? If so, the engine could give up the ghost at any moment. Hopefully you are still flying at an adequate height. Cut back on the throttle to take the pressure off the engine a little and make a flat descent in order to maintain speed. It won't do any harm to keep an eye out for a suitable place to make an emergency landing or to make preparations for bailing out. Pull out all the stops in trying to get back to base. Good luck!

If the plane can only be controlled with difficulty, this suggests a hit in the hydraulics system or possibly that the wires of the steering mechanisms have been damaged. The control surfaces themselves may also be damaged. Try setting course for your home airfield – you can forget about combat for the time being, but you might just make it back to base. Steer carefully, because if you end up stalling you may not be in a position to do anything about it.

"I bailed out with a parachute on two occasions, once during training, and I made fourteen emergency landings, but not once was I hit by an enemy fighter in battle."

Erich Hartmann

Quote from: Sims, Edward H.: Fighter Tactics And Strategy 1914 – 1970.



If you have managed to make it back in a plane which has taken something of a bruising, you must make sure that your landing gear is still working before making an attempt to land. Pay attention to the monitoring lights and switch to an external view via F2 if necessary. If the landing gear cannot be lowered automatically, you may be able to do this manually. Make sure that you are familiar with the appropriate keys (see chapter 6). The landing flaps may also be damaged. If this is the case you will touch down at higher speed – be careful! And pay more attention next time, ok?

5 BEFORE YOU START

Here you will find a brief list of options in the main menu. The most important of these are:

- Pilot Roster** – here you can create (or choose) your pilot for further use in different modes of the game.
- Single Mission** – this is "single mission" mode for a mission that does not imply career growth.
- Pilot Career** – campaign mode. In this mode your hero accomplishes one task after another, keeps his battle statistics, regularly changes over to new equipment, receives ranks and awards after a while, in a word – he fights.
- Multiplay** – multiplay mode
- Quick Mission Builder** – "quick" generator of random missions. We shall take a closer look at the way it operates below.
- Full Mission Builder** – mission editor. It creates missions as well, just like the quick generator, but here the user controls the entire process of creation. It is a more complicated instrument, but also a more powerful one. Please see special section explaining how to use it.
- Training** – missions for beginners.
- Play Track** – "IL-2" enables you to create tracks. In other words, everything that you accomplished while fulfilling your task is fully recorded. This menu option correspondingly plays back these tracks.
- View Objects** – here you can take a close look at all 3D objects modeled for the game and find detailed information on the fighting abilities of military equipment.
- Controls** – here you can reassign control buttons and create your own configuration.
- Credits** – it would be very nice of you if you pressed the button at least once, just out of curiosity.

Hardware Setup –

here you can adjust the settings pertaining to your hardware. This option is also used for choosing the optimal solution while determining the rate of program operation and detail of the reproduced 3D image.

Difficulty –

includes various realism-related settings. It should be pointed out that the level of complete realism in this flight sim can become a problem for beginners. Even the fans are divided on the item – what some of them think quite appropriate is deemed downright unfair and unrealistic by the others.

Exit –

quitting the game; sometimes it is necessary.



Now we can consider each menu item in more detail.

6 PILOT ROSTER

"IL-2" can simultaneously store information on several virtual pilots. The process starts by pressing the **Create** button, which results in a new entry in the list of personal files. All you have to do is enter a full name and call-sign by clicking in the corresponding fields. The process is completed when you have chosen one pilot out of all those recorded. To do this click on the corresponding entry and press the **Select** button. After that, you will be returned to the main menu where the pilot chosen has already appeared in a special indicator. **In doing this, all individual control settings are preserved.**

7 CONTROLS

Key control panels available in a separate document.

As was already mentioned, this is a reassignment of the controls. Having chosen the **"Controls"** item, you access a long menu that can be scrolled through using the slider on the right. The left of the menu is taken up by a list of actions you perform (e.g. "release the chassis"); the button initiating the action is indicated on the right (in this case it is "G"). If, for some reason, you find that you are not satisfied with the default settings, you should click on the field where the button is indicated. The field will subsequently be surrounded by a gray frame and you will only have to press the hotkey (or alternatively a mouse/joystick button), which you want to see in this place.



You might decide that the previous settings were better. We have devised a special "reset to default" button for this purpose, which immediately returns the configuration to the "by default" status.

To adjust **HOTAS** controls, perform the actions described above with only one difference: after you have clicked on the axis you want to assign for your **HOTAS**, move the device meant for it slightly in the corresponding direction.

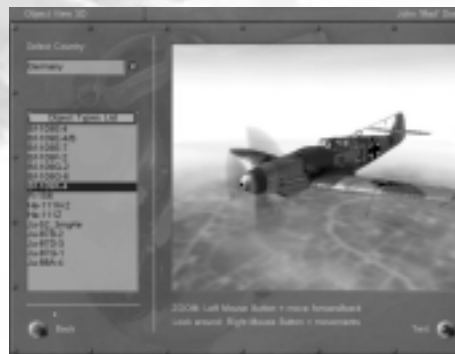
If you want to quit the menu, press the **"Apply"** button. All changes made will be activated immediately.

Additional in-game Joystick Settings.

Find and press the Hardware setup button in the game's Main Menu. You are now in the hardware setup menu. Press the **Input** button. Here you can set up the following features for your joystick:

1. Dead Band used to set a dead zone where any small movements of stick will have a reaction almost equaling zero. This feature can be helpful if you are playing a flight simulator for the first time or have the old type of joystick. If you are an experienced flight simmer, we strongly recommend that you set Dead Band in the left position or very close to the left position.
2. Filtering allows you to set a digitized filter if your joystick has problems with inadequate reaction.
3. You can select basic joystick axes and change their profiles by fine-tuning in the special table used to adjust the stick reaction curve. Some joysticks need fine-tuning, but most work correctly with our default settings. You can select the axis for fine-tuning in the left combo-box.
4. To enable or disable the Force Feedback feature, set the Force Feedback switch to On or Off.
5. If you find that our initial settings were more appropriate before your changes, press the Default button. All the settings will subsequently be set back to default.
6. Press Back to quit this menu. In this case any changes made will be applied automatically.

8 VIEW OBJECTS



There are a lot of 3D objects in the game. When you choose this menu, you immediately access the next one where all the objects are divided into classes.

- | | |
|-----------------------------------|---|
| Aircraft – | all aircraft |
| Tanks – | not tanks alone, but with self-propelled artillery mountings or SAU included. |
| Ships – | hips, cutters and submarines placed above the water. |
| Vehicles & Artillery – | towed vehicles and artillery. The list includes mobile rocket launchers – our "Katushas". |

Having chosen any of the above-mentioned objects, you directly access the viewing mode. Here the list of objects falls into two categories, in terms of nationality – Soviet and German military equipment. You make your choice via the "Select Country" drop-down menu.

Now you have only to choose what you want in the left part of the menu. Once you have done so, a description of the object appears in a large window. By pressing the "View" button in the lower right corner, you can display its 3D image. You can zoom in or out on this image by pressing the left button of the mouse and moving it forwards or backwards. You can also rotate the image by pressing the right mouse button and moving the mouse in any direction.

After examining the object, you can return to its text description using the same button (the inscription under the button will change to "Text").

To quit view mode, press the "Back" button.

9 PLAY TRACK

Tracks recorded in the course of the mission and are saved as special files with the .trk extension in the "Records" directory. The "Play Track" option in the main menu is used to play them back.

Once you have chosen the option, you access a menu controlling the playback of the tracks. Above, there is a window in which you choose the appropriate track. Below, there are three toggles that switch on/off the options listed below. When a toggle is switched on, it is in the upper position.



- Loop** – used to switch off the loop playback, which is convenient for editing.
- Manual Time Compression** – enables/disables time compression during track playback.
- Manual View Control** – enables/disables switching over the views.
- In-Flight Messages** – determines whether the messages received by the pilot during his mission should be displayed on-screen.

There are two buttons below these options:

- Main Menu** – returns to the main menu
- Play Track** – begins track playback



Once you have chosen the track and pressed the "Play Track" button, the program will load it and start playback. You can interrupt the process at any time by pressing Esc; you will subsequently be returned to the menu described above. The only difference lies in the buttons – the left button will be called "Stop Playing Track", and the right one – "Continue". They will either resume playback or stop it completely.

If you press the "Stop" button, the buttons will retrieve their original commands – "Main Menu" and "Play Track".

10 TRAINING

This section is intended for beginners who are getting acquainted with flight simulators for the first time. **We advise you to start with simple flying.**

Each mission is built in such a way that during the flight demonstration, a text explaining the actions of the pilot appears on-screen. You can take up control of the flight at any time and continue on your own. However we recommend that you view each demonstration for the first time to **remember the basic skills for combat aircraft control.**

11 SINGLE PLAY



With "IL-2 Sturmovik", you can play virtual combats on the side of the USSR or Germany. Consequently, single missions and campaigns are both divided into Soviet and German.

Single Missions

You can accomplish one task of your choice in this mission. Your performance will have no effect on your pilot's status and private account.

When you activate this mode, you access the mission menu, which contains the following items:

- Select Country** – here you choose the country you will be fighting for. As mentioned above, there are two possible options – the USSR and Germany.
- Mission Type** – dogfight or bomb run.
- Mission Files** – each mission is stored in a special file. You can find the list of files below and load any of them. To make things clear, we have placed a short mission brief to the right of the list.



12 PILOT CAREER (Campaign mode)

Before you embark on your pilot career, here is a historical overview of the main great battles modeled in the game.

On 18 December 1940, Hitler ordered that preparations be made for the so-called 'Operation Barbarossa', as the battle for 'lebensraum' (living space) in Eastern Europe came to be known. After the lightning victory ('Blitzsieg') over France, there was enormous euphoria in Germany over the "greatest warlord of all time". The German Reich was now in control of the continent from the North Pole to the Spanish border. Hitler was not to be halted, and in future he was to become more and more involved in the operational leadership of the 'Wehrmacht' (German armed forces). The battle with Russia was planned as a war of annihilation from the very beginning. As Hitler explained in a discussion with the Chief of Staff of the Wehrmacht High Command, Alfred Jodl, "The coming campaign is more than merely a battle of arms; it will become a conflict between two different philosophies". Hitler also stated that the war was to be waged with uncompromising severity - according to one order, Soviet volunteers were to be liquidated "mercilessly", regardless of whether they were in combat or trying to run away.



On 22 June 1941, the German armed forces entered the Soviet Union, thus breaking the German-Soviet non-aggression pact which Hitler and Stalin had signed on August 23 1939. National Socialist propaganda declared that the Russian campaign was "in defense of Europe against Bolshevism" and hoped for another lightning victory – Hitler planned to conquer Russia in its entirety in only eight weeks. The army was divided into three groups – one to conquer Leningrad, which would then in turn join forces with the second group in the assault on Moscow. The third group was to march towards Kiev in order to gain control of the oil fields in the south. Many historians consider Hitler's insistence on splitting his forces into three relatively weak army groups a first step to Germany's ultimate defeat.

The German Luftwaffe had a decisive part to play in this plan, destroying many Soviet aircraft before they even got off the ground. Nevertheless, the initial successes of the Luftwaffe could not hide the fact that it was not equipped for a long-running battle. Over-hasty mass production of machines that had hardly been tested and the adaptation and misuse of proven models meant that many promising aircraft were not used to their full potential.

The German army marched in with over three million soldiers, including 75 percent of the field troops and 61 percent of the Luftwaffe. The invading forces counted no less than 153 divisions among their number, including 19 of the total 21 tank divisions. Altogether there were 600,000 vehicles, 3,580 tanks, 7,184 guns and 1,830 aircraft involved in the Russian campaign. The Soviet forces were represented at the European front by **4.7 million soldiers**.

Stalin was unprepared for the German assault and had played down all the obvious signs which suggested that an attack was likely, treating them as "mere provocation". The announcement that the Fascist "monstrous cannibal" had attacked caught him unawares. It was however not a surprise for many Soviet commanders, including some generals of the high command. An order was issued just a few hours before the invasion, warning front-line commanders about imminent "provocation attempts". It didn't reach its recipients in time.

Nevertheless, although the Germans soon captured Smolensk and Kiev, attacked Leningrad and took 1.5 million prisoners of war, the Soviet Union as a whole refused to fall in with Hitler's plans and capitulate by the time winter arrived. The non-aggression pact between the Soviet Union and Japan enabled Stalin to call on reinforcements from the east. Not only that, but the Soviets succeeded in evacuating over 1,500 production centers and around 10 million civilians to the east. Hitler had not expected an operation of this scale at all. Moreover, the German troops, ill-equipped for the harshness of winter at the Eastern Front and stretched to their limits, were finding it more and more difficult to organize supplies. Hitler had completely underestimated the determination and might of the Soviet forces, their strength in numbers and the potential of their armaments.

Hitler ignored the advice of his army's High Command to pool the German forces and finally press on towards Moscow. Instead he ordered the capture of Leningrad and the occupation of the Ukraine. The first German troops did not reach the outskirts of Moscow until 2 October 1941, and Hitler instructed them to hold position. His Chief of Command Walther von Brauchitsch advised the withdrawal of troops to more favorable winter positions, but Hitler again remained firm, showing no hesitation in taking overall control of the army himself. The notion of a speedy victory was thus dispelled.

Admittedly, the Germans succeeded in capturing parts of the Soviet supply areas, but this did not lead to a decision in the Caucasus or in Stalingrad during the offensive mounted in summer 1942. The German sixth army was surrounded on 10 November 1942 at Stalingrad and surrendered on 31 January 1943. Between 1942 and 1943, the German Wehrmacht lost almost a million soldiers. Stalin, Roosevelt and Churchill held a summit in Yalta to discuss their post-war policies and strategies for achieving a "just and lasting peace". The Red Army captured Berlin and Hitler committed suicide. On May 8 1945, Germany capitulated, thus putting an end to the war in Europe.

1941: Smolensk

The First German Victories –The Battles of Smolensk and Kiev

"The Russians didn't show the same amount of initiative as the enemy pilots at the Western Front. But the elite units of the Red Guard really were very good. Their aircraft were painted in red right up to the cockpit and their pilots had a real taste for battles on the turn. Our Me 109s were better at high altitudes, especially at the beginning of the campaign. We could maybe shoot down five planes in one day - but by the next day there were just as many there again..."

Günther Rall

Quote from: Sims, Edward H., *Fighter Tactics And Strategy* 1914 - 1970.



The first major encirclement of Soviet forces took place in the area of Bialystok-Minsk. But Hitler already feared that the ring with which the Soviet troops had been surrounded could be too large and therefore wanted to stop the tank groups earlier than planned. At this stage, his general staff were still able to get their way, however. Their tactics proved to be successful, as once Minsk had been captured on 26 June 1941, the Wehrmachts High Command were able to

register the following successes: 400,000 prisoners of war and 600 guns had been captured, 2,233 tanks and 4,107 planes had been destroyed, all at a cost of only 150 German aircraft losses. The sheer numbers given here should have provided clear indication of the enormous military strength in the Soviet Union as a whole, but Colonel-General Franz Halder was already predicting that the campaign would be won in two weeks' time.

After the first major battle of encirclement at Bialystok and Minsk, the central army group advanced from the north towards Smolensk, 'the gateway to Russia', and the Second Panzer Group made its way from the south in an attempt to encircle the Soviet troops at the city's western front in a pincer movement. The troops then planned to advance towards Moscow in a concentric tank wedge. Meanwhile, the Soviet High Command in the Smolensk area was pulling 42 divisions together to prevent the German troops from getting any further towards Moscow, which was around 400 kilometers away. This defensive maneuver ended in failure as the mobile German troops succeeded in evading the Red Army's defensive strongholds of the Dniepr crossings Mogilev and Orsha south-west of Moscow. After heavy street battles, the city fell into German hands on 16 July 1941.



In spite of the baking summer sun and the huge dust clouds which hampered their armored vehicles, the 2nd and 3rd Panzer Groups and the infantry divisions of the Second Army managed to trap 15 Soviet divisions of the Second Army by 24 July. Between Smolensk and Orsha, the Red Army lost around 3,000 tanks and over 300,000 soldiers, who then became prisoners of war after the battle came to an end on 5 August.

Despite the triumph at Smolensk, the German military leadership found itself in a severe crisis. Walther von Brauchitsch, commander-in-chief of the army, and Chief of the Army General Staff Halder pleaded for a swift advance by the central army group towards Moscow. Hitler, on the other hand, favored conquering the Ukraine first, pointing to the fact that its oil and raw material deposits were of immense strategic importance for Russia. Hitler got his way and ordered units of the Second Army to proceed to the south for the battle of Kiev.

The Second Army of the central army group first succeeded in capturing Gomel and then managed to create a cohesive front at the Dniepr with the southern army group. The 17th army of the southern group captured the bridgehead at Kremenchug, creating a base from which to advance northwards to Kiev, 250 kilometers away. Together they encircled five armies of the Soviet southern front in a pincer movement. At the same time, the Sixth Army under the command of Field Marshal Walter von Reichenau was attacking from the west. The ring was closed and Kiev was brought under German control. On September 8 the fighter squadron 51 (JG 51) commanded by Werner Mölders announced air victory number 2000. The battle of encirclement in the east of Kiev was to continue until 26 September and led to the surrender of 665,000 Soviet soldiers. The Germans also seized over 880 tanks and 3,700 guns. The morale in the army was high and the Wehrmachts High Command had every hope that they would be able to advance into the Caucasus before the onset of winter.

1941: Moscow

'Operation Typhoon': The March to Moscow

"To fly a combat mission is not a trip under the moon. Every attack, every bombing is a dance with death."

Serafima Amsova-Taranenko

in: Noggle, Ann (1994): *A Dance with Death*. Texas A&M University Press

2 October 1941: the mild Autumn weather was still kind to the German troops – 'Operation Typhoon' could begin. On the evening of 3 October the tanks of Generaloberst Heinz Guderian surprisingly took control of Orel at the Oka River, thus cutting off the rail connection between Moscow and Kharkov. At the same time, the Sixth Army under Field Marshal Walter von Reichenau was marching on Kharkov. In the Vyasma-Bryansk area, German troops trapped Moscow's defenders in their pincer attack - yet another battle of encirclement was underway.





With the support of the dive bombers, the units of the 4th Panzer Group broke through the great Moscow defenses between Tver and Kaluga, overcoming concrete bunkers, anti-tank barriers, minefields and stationary flamethrower batteries – not to mention the first Siberian troops from Vladivostok. German troops also succeeded in breaking through Soviet defenses in Mozhaik and Volokolamsk and at the river Nara to the east of Mozhaik, destroying enemy rocket launcher batteries en route.

So far so good, as far as the German troops were concerned – until the first snowfalls came, that is. These first signs of the bitterly cold Russian winter were followed by another natural obstacle in the shape of mud. The German advance soon ran into difficulties, not only due to the absence of warm winter clothing, but also because the supply of fuel fell victim to the elements, plunging the campaign into a transport crisis. The Soviet rail system provided an additional burden – the Germans first had to adapt the width of the tracks to German standards – Russian tracks were too narrow for German trains.

On 16 October the Germans, now with help from the fourth Rumanian Army, encircled four Soviet infantry armies and took 100,000 Red Army soldiers prisoner. Just one day later, the battle of encirclement at Vyasma-Bryansk came to an end. The Wehrmachts High Command was able to declare the following as either destroyed or vanquished: 67 artillery divisions, six cavalry, seven tank divisions and six tank brigades! To the south, the Germans captured Stalino in the Donez basin, taking the number of Soviet divisions destroyed up to 300. Nevertheless, the Russians kept on coming back with stronger guns – as well as the superb T-34 tank and the Katyusha rocket launcher known to the Germans as the 'Stalins organ' were being used more and more frequently.

29 October 1941: The attempt to capture Tula, approximately 80 km outside of Moscow, ended in failure. The German tanks came under heavy fire from the anti-tank defenses and flak guns around four kilometers away from the city boundary. Capturing the city from the other direction also failed, which was no wonder given the fact the 4th Panzer Group was literally stuck in the mud at the Moscow marshes and at the Smolensk-Moscow ridge.

Between 6 and 12 November 1941, the muddy period was drawing to an end and being replaced by frost on all fronts. To begin with, this allowed the German troops to resume their assault, but it was only a matter of time until the merciless Russian winter seized the Germans in its icy grip.

Stalin now made the decision to send Siberian and Cossack divisions into battle, using the fact that these troops were more than prepared for the harshness of the elements to his advantage. The scene was now set for the final battle for the second Moscow defense position.



The German plan was as follows: to start off by capturing Klin, then turn to the south-east, cut off Moscow from the north and then cut through the connection between Moscow and Leningrad.

The German troops were gradually moving forward. Meanwhile, the members of the Antikomintern Pact held a summit in Berlin on 25 November. The German Reich, Italy, Japan, Spain and Manchuria extended their pact for an additional five years; Bulgaria, Denmark, Finland, Croatia, Rumania, Slovakia and China also joined the pact, giving Hitler's advisor Joachim von Ribbentrop the confidence to declare the 'bolshivist colossus' to be already in ruins. At this stage, the German troops were still about 30 kilometers away from the Russian capital.

A day later, the Red Army launched its first major counter-offensive at Rostov. The German troops evacuated the town and General Field Marshal Gerd von Rundstedt asked that they should be allowed to retreat, but Hitler had no intention of agreeing to his request. This spelled Von Rundstedt's departure, and Hitler replaced him with Field Marshal Hermann von Reichenau.

At temperatures of minus 38 degrees Celsius and with only their summer uniforms to keep out the cold, the troops' morale was sinking by the day. Many troops froze to death, starved or slaughtered their own horses in order to stay alive. Fuel was becoming scarce and tanks were getting stuck as a matter of course. Not only that, but many engines were giving up the ghost in any case due to the lack of anti-freeze.

By the middle of December many units had switched from attack to defense. There were loud cries for a retreat to winter positions – positions which, in fact, did not exist. But Hitler had no time for any signs of weakness or surrender. Instead of sending winter equipment to the front, he sent his soldiers ammunition. By this stage Hitler had assumed overall command of the army himself, trying to combine running the state and the military whilst refusing to take any advice whatsoever. Hitler was more committed than ever to holding on, in spite of the phenomenal drain on his men and their resources and in apparent denial of the failure of the Blitzkrieg strategy.

Back home, winter clothing was being donated and collected for the troops in the east, but the transport crisis meant that it was impossible to get these supplies to where they were needed. Tank production was increased from 125 to 600 units a month, but this extra production was at the expense of the air armaments program. The fact that the air armaments industry had also been dragged into the crisis put a seal on this disastrous state of affairs for the German forces.

The German advance finally came to a standstill 30 kilometers outside Moscow. Chaotic planning, diverging strategic concepts and inadequate preparation were now taking their toll. 'All or nothing' was now Hitler's war cry, with which he hoped to force a swift conclusion after the failure of his overall war plan in the Autumn of 1940. The next step was clear - Stalingrad or bust.



1942: Stalingrad

Bitter hand-to-hand fighting in a city under siege

If there was one thing that the two arch enemies agreed upon, it was that the winners of the battle of Stalingrad would also emerge victorious in the battle for Russia. The battle of encirclement at Stalingrad, logistically the most important center in the Caucasus and, with its tank factories, the industrial heart of Russia, was a human and material battle the like of which had never been seen before. The trench and positional warfare that marked the battle of Stalingrad led Russian propaganda of the time to speak of the conflict as a 'Russian Verdun'.



The Sixth Army, Hitler's elite troops under the leadership of General Friedrich Paulus (who was eventually promoted to Field Marshal later), were the main combatants in this, the biggest battle of the Eastern campaign. They were supported by sections of the 4th Panzer Army who had arrived from the south.

10 August 1942: The first waves of German troops broke through as far as the outlying districts of Stalingrad. Nine days later, Paulus ordered the attack. On 23 August, the first German attack troops reached the banks of the Volga, supported in their quest by the aircraft of the VIII Air Corps of General Martin Fiebig. By October, they had managed to capture 90% of the city. The battle was by no means over, though - the ruins of the city provided an ideal hiding place for Soviet sharpshooters, and many machine gun positions were tucked away in its dark alleys. The conflict was becoming more and more gruesome, the soldiers battling it out with bayonets, rifle butts and even spades as attack followed attack.

The enormous psychological burden was compounded by worries over reinforcements and the cruel Russian winter. As early as September, General Paulus tried to persuade Hitler that Stalingrad could not be conquered. "I cannot change this, it goes beyond the means of human strength," yet Hitler stuck to his guns and his officers refused to give up. They motivated their men to their limits - and beyond. By the middle of October, the German troops had occupied the whole of north Stalingrad.

Nevertheless, fresh waves of Soviet troops were already preparing themselves for 'Operation Uranus'. Paulus pleaded with Hitler to allow the German troops to retreat, but to no avail. On 19 November 1942, the Red Army attacked as anticipated. Soviet soldiers encircled the German troops from the north and the south, absolutely determined to force the Germans to surrender. 300,000 men were thus trapped in Stalingrad. Hitler ordered them to hold position and promised sufficient help from the air and General Paulus happily agreed, his faith in the Fuhrer's promise not faltering for a moment.

This was a promise which Hitler had great difficulty in keeping, as not only did the German Luftwaffe have an insufficient number of planes, the aircraft which they did have were weakened by the strength of Russian anti-aircraft defenses. Air fleet 4 did what it could, however. Transport planes from Tunis and Sicily were called up and adapted from summer to winter conditions as quickly as possible. By December, about 200 Ju-52 aircraft and 100 He-111 bombers with empty bomb compartments had been organized as transports, and by January 1943 the number had grown to 467 aircraft in all. Sixth Army demanded 700 tons of supply per day, every day. The Luftwaffe at this stage was barely capable of delivering 350 tons, and only for a short period of time - even that estimate completely discounting any Soviet opposition.

The Russians were tightening their grip on the city and the German troops were fast running out of food and ammunition. At temperatures of up to 40 degrees below zero, they stuck out the siege as best they could. In the words of one officer: "At the end we were so exhausted that we did not even have the strength to stand at our machine guns. We tied shoelaces and pieces of string to the trigger and hung on to them with all our might whenever we had to shoot. In any case, we only fired if we really had to, as we were afraid of blowing our cover."

On 12 December, German LVII Panzer Corps set off towards Stalingrad to liberate their besieged comrades. But 'Operation Winter Storm' was a failure and the tank units gave up two weeks later, leaving the Sixth Army under siege and without reinforcements. The situation was becoming more and more hopeless, and the German troops froze to death, starved or died in battle. The troops in the Kette were not made aware of the rescue operation's failure. Besieged Germans kept listening for distant engine sounds hoping they were of the liberating SS Panzers for many months to come.

On January 21, Paulus radioed the Fuhrer's headquarters with the following message: **"Troops without ammunition or food. Signs of disintegration on the southern, northern and western fronts. 18,000 wounded without the most basic dressings or medicine. Front broken up in many places due to major setbacks. Further defense pointless. Army requests permission to surrender in order to save lives."** A little later, the Gumrak airfield also fell into Russian hands and with it any hope of supplies. On 31 January, Paulus and his officers surrendered to the Russian forces.

Between 24 November 1942 and 31 January 1943, 488 aircraft along with 1,000 men were lost in supplying Stalingrad alone. This amounted to five squadrons – more than an entire flying corps. Of the 300,000 German soldiers who had set off to capture Stalingrad, 145,000 died. 45,000 troops, some wounded, some essential specialists, were flown out in time. 90,000 more were taken prisoner by the Russians. Years later only 6,000 of these returned home.

1943: Kursk

'Operation Citadel' – the tank battles at Kursk

"I came up against the IL-2 at the Eastern Front. We got a message that low-flying fighters were in the area. Our squadron leader led the way, and I then saw the slow-moving IL-2s. I was flying a Bf-109 G. My squadron leader gave me a target instruction with the words "I hope your teeth are still in good condition!" As for what he meant by that exactly - well, I soon found out, because I used up half my cannon ammo. All the IL-2 planes were destroyed, a total of about eight planes."

Georg Adam
(Interview, November 2000)



On 15 April 1943, Hitler gave the order for 'Operation Citadel', the pincer attack on the Kursk bulge (also referred to as the Kursk salient), which was to become the biggest tank battle of the Second World War. The Russian front in the Kursk area which had advanced 100 kilometers to the west was to be encircled by the central and southern army groups and the Red Army troops there destroyed. In a second

stage of the operation, it was planned that the army groups should then advance into the depths of Russia.

The Soviet High Command had got wind of Hitler's plans and had decided as early as March to fend off the German attack and then to go on the offensive. Within three months the Red Army set up eight strongly consolidated and mined lines of defense, running to a total depth of no less than 300 kilometers. In the main defense strip alone, 434,667 tank mines and 7,000 kilometers of wire obstacles were laid.

900,000 soldiers of the German Wehrmacht were faced with 1,337,000 Red Army troops. 10,000 German guns were up against 19,300 on the other side. The Germans had 2,700 tanks and submachine guns at their disposal, the Russians 3,300. And as far as fighter planes were concerned, the Germans were again outnumbered 2,650 to 2,000. The Messerschmitt Bf-109 G fighter plane was one of the improved models now available, with its new, powerful 1,700 hp Daimler-Benz engine.



The Focke-Wulf FW-190 was also a major presence at Kursk. The eighth flying corps included 68 ground attack aircraft of the Hs 129 model, whose weaponry was most useful for anti-tank combat – hence their nickname 'flying can openers'.

It was plain to see that the Russian side was far stronger, even disregarding the 573,000 soldiers, 7,401 guns and 1,551 tanks and self-propelled weapons at the Steppe Front. In addition, the German panzer division had already incurred serious losses in terms of men and materials. Hitler put his trust in the introduction of new tank models such as the 'Panther', 'Tiger' and 'Elefant'. Yet his favorite, the 'Panther' was not yet considered ready for action as it had not been tested adequately. So the German position coming into 'Operation Citadel' could hardly have been worse. In spite of this, early in the morning of 5 July 1943, panzer, panzer grenadier and infantry divisions of the Central and Southern army groups embarked on the operation, which was fought out bitterly on both sides.

The German air fleets 4 and 6 started off by attacking the hinterland and then focused on ground combat to clear a path for their tanks. The Germans were to have control of the Kursk bulge for only a matter of days, as it was no time at all before they were complaining of fuel shortages. They succeeded in taking a heavily fortified key position at Oboyan in the south, but their assaults on the heights of Ponyri and Teploye ended in failure. The Red Army reacted extremely quickly, leading to fierce tank battles in the rolling steppes of the south in particular. The number of German tanks was decreasing by the day, and General Model was wavering. As early as 9 July he spoke of a war of attrition, saying that the massive deployment of tanks was of little real use. To top it all, the Red Army drew on its reserves and the news of the Soviets' partial attacks in the Orel bulge reached Model on 11 July. One day later, the Soviets went on to the offensive and plunged the second Panzer army into a deep crisis. Model had to put a stop to his attacks in order to bolster German defenses in the Orel bulge and to prevent the worst from happening.

This was typical of the whole operation – the Wehrmacht was only able to form attack groups at narrow sections of the front and in brief bursts, whilst at the same time other areas suffered. What made life difficult for the German troops was not only that they were outnumbered by the Soviets, the means at their disposal were inadequate and they were fighting on unknown terrain with poor roads. Under these circumstances it was little wonder that morale was slipping by the day.

The battles continued nevertheless. The tank battle at Prochorovka on 12 July 1943 was undoubtedly the most significant of the Kursk battles. 850 Russian and 500 German tanks met, quite unexpectedly for both sides, on the narrowest of battlefields. A second Russian counteroffensive began at Belgorod and Kharkov, the double battle of Donetsk and Mius to win back the Donetsk basin began on 17 July. On 3 August, Orel was surrendered by the Germans. Three days later Belgorod, the second prong of the German offensive, was lost. As the battles mounted up, the might of the Red Army grew, whilst at the same time the German tanks and weapons grew weaker and weaker. The withdrawal began at the beginning of September – the Soviet troops had emerged victorious.



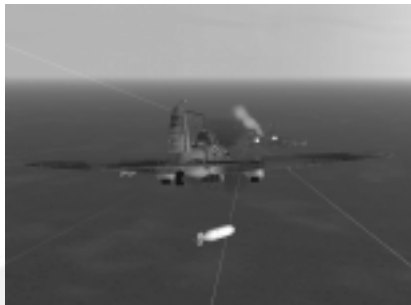
Looking back, the battle in the Kursk bulge is often seen as one huge tank conflict, but this was not the case. The conflict should, instead, be seen as a series of individual battles and operations. Opinions also differ strongly over the length of the battle. The Russians speak of 50 days, the Germans on the other hand talk of no more than nine. The numbers of losses on both sides are also a matter of debate. The Russians lay claim to having destroyed 4,605 German armored vehicles and to having captured 521, but the Russian figure of 'Tigers' destroyed in the Kursk bulge (146) greatly exceeds the number of these tanks actually deployed by the Germans. Germany reported a total loss of 33 'Tiger 1' tanks. It is extremely difficult, if not impossible to track down reliable figures on Soviet losses, as the USSR was always extremely reluctant to have its military strength questioned. One thing is for sure, however, the personnel and also material losses of the Red Army far exceeded those of the Germans.

1944: The Crimea

From the War in the Crimea to the Red Army's March into Berlin

The Ukraine had already been lost. The 17th Army, which had been completely cut off since 1 November 1943 and supplied via the sea route, was alone in defending the isolated bastion of the Crimea. Hitler was furious and blamed the two army High Commanders General Field Marshal Erich von Manstein and General Field Marshal Ewald von Kleist, who were promptly dismissed to the 'second division' of German military leaders.

The 4th Ukrainian Front commenced its dual offensive in April 1944 with the aim of liquidating this German outpost. On 9 May, the Russians regained Sebastopol. 'Admiral Black Sea' Vice Admiral Brinkmann and 'Sea Commander Crimea' Rear Admiral Schulz ordered the evacuation far too late, and coastal batteries blew up their guns on the sea voyage to Rumania.



This was followed by a break in fighting. On 22 June 1944, the skies were filled with a mighty cacophony: hundreds of bombers and fighter planes were pounding the German artillery positions, and thousands of 'Stalins Organs' filled the air with their wailing. The Red Army's breakthrough at Vitebsk split apart the 3rd Army Front and divided it into two parts, making all attempts at escape futile.

The Russian tank units continued with their advance and the gateway on onto Belarus was wide open as vast gaps in the Front appeared. Once the Fronts had been penetrated, the Russian advance came up against very little opposition. Nevertheless, Hitler clung on to his insistence on defending German lines even though he had already long lost his overview of what was happening. Yet even he soon realized that he was no longer in a position to lead, but instead merely to patch things up at the edges.



To add insult to injury, in July 1944, 50,000 German prisoners of war were marched through the streets of Moscow as evidence of the victory over the 'fascist German forces of occupation'.

By July 1944, the Soviet troops had advanced as far as the Vistula. Despite this, Hitler took additional defense measures in September, calling on all men between 16 and 60 to join the so-called 'Volkssturm', or German Territorial Army. They were given a crash course in operating bazookas as German cities were fortified. Every man available had to join up or face the death penalty. Meanwhile, the Soviet advance continued relentlessly, and the first Soviet troops made it into East Prussia in October.

Both German and Soviet high command regarded the Crimean peninsula as an important tactical objective, while in reality it may not have been. In his decision to defend Crimea, Hitler pointed out its importance as a potential staging point of air attacks against Romanian oil fields – but Soviet tanks were already advancing towards those fields in Romania itself! The main objectives of the war lay far away from Crimea. It was nevertheless a sore spot on both sides' maps, and both committed to full-out war there with tremendous personnel losses. The gain to these losses is questionable at best, especially for the Germans.

1945: Berlin

When Soviet and American soldiers shook hands at Torgau on the river Elbe on 25 April 1945, the symbolic effect was clear - it was only a matter of time until the end of the war in Europe. The Red Army had already made it as far as the center of Berlin, and Adolf Hitler committed suicide on 30 April. He had nominated Grand Admiral Karl Dönitz as his successor, who planned to offer a partial surrender to the western forces. Dönitz hoped that the Germans would then be able to continue the battle against the Red Army if the



Western powers allied themselves with the Germans against the Soviet Union. His hope was in vain. At midnight On 8 May 1945, a ceasefire was declared. Germany capitulated unconditionally to the allied forces. The German Reich lay in ruins, the terrible nightmare of world domination had been brought to an end after 12 years of the most appalling human rights abuses perpetrated by the National Socialist regime. Putting an end to the terror had, however, involved an enormous cost to the whole of the world.

A VERY IMPORTANT NOTICE ABOUT THE GAME:

We do not claim to have given absolutely accurate coverage of the history of a pilot career or any subdivision in all the battles of the war. However have done our best to keep our scenarios in line with the events that occurred in real life.



For each campaign, you will immediately see on whose side and on which class of aircraft the campaign will be flown through (you are reminded that it is possible to fly for the USSR both on ground attack planes and some fighters, while German pilots have only fighters at their disposal), the military rank of the main character (from junior lieutenant to colonel and correspondingly from sergeant-major to oberst), the number of awards and completed missions as well as the level of difficulty.

The "**View Career Statistics**" button provides detailed information on how the campaign proceeds – how many and which enemy targets were destroyed, the awards received and how many aircraft the player lost in fighting.

- Back** – return to main menu;
- Delete** – delete selected campaign;
- New** – begin new campaign;
- Load** – load selected campaign.

If you enter a new campaign, you should indicate:

Rank – depending on your rank, you will receive more/less planes under your command. Further promotion and demotion are possible (albeit without the possibility of being sentenced to be shot or sent to a penal battalion).

Career – this is where you choose what to become – ground assault pilot or fighter pilot. Again, you can only choose between the two if you are playing for the Soviet Union.

Difficulty – adjust the level of difficulty once and for the whole campaign.

TIP: Before embarking on your Pilot Career, please read items "Receiving the task", "Arming your plane" and "USING COMMANDS TO GIVE ORDERS TO AI-PILOTS (COMMS)"

Here you will get to know your route and the object of your flight, as well as choose the weapons for your plane. You are advised to read the text concerning the task right away – it is placed on the right.

Your route is indicated on a map. The map can be scrolled in any direction by moving the mouse without releasing the left button.

The map has several scales. You can switch between them by pressing the right mouse button; the scale increases up to the highest value, before scaling back down.

- Take-off** – a square with a picture of a plane taking off. It determines the airdrome from which your aircraft will start the flight.
- Turn** – a circle with a point in the middle. Here your aircraft will have to set a new course.
- Attack** – a triangle with a picture of a bomb. This point is set on target; this is where you perform your task.
- Landing** – a rectangle with a picture of a diving plane. In reality it does not dive, but prepares for landing. The point of landing is set on the airdrome where, providing everything is fine, you will conclude the task.

Difficulty – pressing this button activates a menu with different options for realism. We shall deal with these settings in more detail a bit later.

Arming – choosing the guns for your combat task.

Fly – and proceed directly to fulfilling the task;
Back – and return to the choice of mission menu.



Arming your plane



Or planes, to be more precise. In most cases, you will have to command someone – and correspondingly determine the loadout of your subordinates.

There are four parameters, which can be defined during armament:

Convergence. Generally speaking, gun and machine-gun shots are not directed parallel to the axis of shooting aircraft at all. This convergence can be modified; here everything depends on your preferences. It should be pointed out that no matter whom you command, this operation can only be performed on your aircraft.

Rocket delay. All rockets (except armor-piercing) have two fuses – a contact and a time fuse. Here you can set the time when the fuse will snap into action; possible delay can be of up to ten seconds.

Bombs delay. Sometimes you have to bomb at very low altitude. In this case you run the danger of being hit by the blast of your own bombs. To prevent this you can adjust their fuses in such a way that they will explode with a small delay; meanwhile you will have just enough time to leave the zone of destruction. The delay is set within the limits of 0 (instantaneous explosion) to 10 seconds.

Fuel Quantity. If the flight is going to be short, but you want to load up to the full, you can save on fuel. It goes without saying that too much economy of this kind can lead to sad consequences.

Further on, in case you are or have become a commanding officer while going through the Campaign, you can change your Flight loadout (the name of the aircraft or a group of aircraft is emphasized with red) or the whole Squadron. It is easy to find out whether you can or cannot do it at the moment – just click on the Weapons window in each of the aircraft groups (each Flight has a corresponding window). If you are offered to choose something else, you are free to do so. However, we offer optimal armament and loadout for this mission by default.

You will find the list of weapons with a brief description of the features in the **GAME GLOSSARY** section.



USING COMMANDS TO GIVE ORDERS TO AI-PILOTS (COMMS)

In all cases - Single Missions, Pilot Career and Quick Mission Builder, you can and sometimes should use an opportunity to command from Wingman to Squadron.

To quickly master the basic commands, you should train in the Quick Mission Builder and create different mission variants with varying quantity of friendly aircraft (from 2 to 16) and a small amount of enemy aircraft. Although not all opportunities of such command can be checked in the Quick Mission Builder, the skills you can acquire here will can come in handy when you play Pilot Career.

By default, the **Tab** control settings button activates communication (comms) between player and AI-pilots. The principle is very simple: After pressing the **Tab** button, the list of commands corresponding to buttons 1-0 on the keyboard appears on the screen. Most of the orders or requests have additional submenus, where the list of orders or requests corresponds to actual tasks. They too correspond to buttons 1-0 on the keyboard; by selecting and pressing them, you will get an equal reaction from AI-pilots.

If you have no reaction, this may be a result of an incorrect order or an incorrect time of order. For example, if the friendly planes do not belong to your flight, group or squadron, they will never follow your order. Another example of an incorrect order is when you try to issue an order for bombers to attack fighters... They may try to do it, but with an awful result for the bombers (you will usually get such a situation only in Quick Mission Builder or if a user designs an incorrect mission). The third example of an incorrect order is if the player tries to give an order to rejoin, when some of the planes are currently very busy with the enemy. Their reaction to your order may cost the life of AI-pilots....

So, good training on the subject of orders for AI-pilots and their groups is necessary! Good training will bring you great success in Pilot Career.

Realism settings

Bear in mind the following: if the switch is On, a red bulb lights up on its left.



Wind & Turbulence. Selecting the option somewhat complicates the conditions you will face while flying your plane. Side wind influences the technique of taking off and landing, and turbulence prevents smooth flying.



Flutter Effect. Flutter is a complicated aerodynamic phenomenon, which shows at high speed when the construction of the plane experiences increasing vibration. If you fail to quickly bring the plane out of the flight mode in which the flutter started, the aircraft will most probably disintegrate.

Stalls & Spins. We shall only say here that these situations are extremely dangerous and an inexperienced person might not cope with them.

Blackouts & Redouts. With high positive overloads, blood rushes away from your head and everything goes dark before your eyes. This is called the "blackout effect". If you do not use an anti-overload suit (which is not very likely to be honest), this effect starts approximately at +5G. Blackout can considerably reduce your field of vision or overlap it altogether.

Redout appears with negative overloads (starting at approximately -2G). In this case, blood rushes to the head and a red screen appears before your eyes. It should be pointed out that both man and aircraft endure negative overload much worse than positive.

The option in question enables you to switch off these unpleasant physiological reactions. Naturally if you do so, the level of realism lowers considerably.

Engine Overheat. If this option is selected, you run the risk of overheating your engine if you force it or fly at full speed. The same happens in real life. The consequences can be disastrous.

Torque & Gyro Effects. Torque appears as a result of propeller rotation. The aircraft leans over to the side opposite to that of propeller rotation. To fly evenly you should parry such movements.

Gyro effect. When the engine operates, you have a rather large mass on the side of the aircraft. This mass rotates at high speed and very much resembles a gyroscope rotor. This results in the following: when you try to turn the gyroscope axis in space, additional torque perpendicular to your effort occurs. To put it bluntly, when you do a turn to the right the bow dives, and vice versa.

Realistic Landings. If this option is selected, you might break the chassis on rough landings.

Takeoff & Landing. The necessity to take off and land. These two elements of flying are not very easy. Especially landing. This is why you have the opportunity to get rid of the necessity to bother with it. You will start and finish your task in the air. Explanations on how the level of realism changes if you do without these two elements seem to be superfluous.

Cockpit Always On. When this option is selected, you cannot make your cockpit invisible. Flying with an invisible cockpit is nice and easy because your field of vision becomes ideal. In real life it is naturally practically impossible. This option is designed for those who enjoy full realism.

External Views. Some people think that taking a detached view at oneself is cheating because a real pilot has no such opportunity. This opinion is not universal, however in "IL-2", we offer you the possibility of deselecting this option, which naturally adds realism.



No Padlock. Padlock is a mode of vision at which the direction of your glance changes constantly to follow the chosen target. There have been a lot of discussions about the realism of such an approach, this is why padlock can also be switched off here if you want to.

Head Shake. It often occurs that the aircraft experiences intense shake, which obviously means the head of the pilot also shakes, hindering your field of vision. If you deselect this option, you will alleviate fulfillment of the task, but lose in realism.

No Icons. If this option is deselected, each object in the air bears a special icon. First of all, an icon immediately makes the object much more noticeable; second, its color indicates the nationality of the object at any distance, and third there is a special inscription on the icon giving the type of aircraft and the distance to it. Strictly speaking, one cannot call it entirely unrealistic. The real picture of our environment is far ahead of its virtual analogue in terms of resolution and the field of vision of a virtual pilot is more restricted than that of a real pilot, even if all other conditions are similar. However in real life there were no icons on targets and you can deselect the option off if you feel like it.

Realistic Gunnery. Deselecting this option produces two effects. First, gun and machine-gun bullets start going strictly straightforward. Second, the hit effect of bullets and shells triples.

Limited Ammo. A standard thing. If you deselect this option, your ammo will never end.

Limited Fuel. Another standard thing. If deselected, you get endless fuel supplies.

Vulnerability. This one could not be more standard. Invulnerability. If the option is deselected, you become invulnerable. Congratulations! The invulnerability option only works if enemy shells and shots hit your aircraft. However if you knock against the earth your aircraft will still come to pieces.

13 QUICK MISSION BUILDER



This is not an editor, but a generator, to be exact. You feed in necessary parameters and get a ready mission on output, which you carry out immediately. This mode can be extremely useful for preparing for online combat because losing to a computer is not shameful. This is how this part of the game works.

When you choose the "Quick Mission Builder" option from the main menu, you access a new menu with the following items:



- Select:** – for choosing the country you will be playing for. Click the button to switch over from red star to black cross – these symbols speak for themselves in our opinion;
- Your Flight** – Number and characteristics of wingmen to be indicated;
- Friendly** – here you enter information on other flights, which will be fighting on your side;
- Hostile** – the same, but for your air enemy.
- You can set the following parameters for each flight:**
- Num** – number of aircraft in the flight, ranging from zero to three with your own flight as the only exception. Fighting without having oneself close at hand is rather difficult. This is why your own flight should have at least one unit. This unit is you yourself.
- Skill** – class of pilots;
- Aircraft** – planes constituting the flight;
- Loadout** – battle armament for mission.
- Map** – the map where the action will take place;
- Altitude** – altitude at which the action will kick off;
- Weather** – weather;
- Time** – time of the day. These last two factors – weather and time of the day - can exert considerable influence on the development of your operation.
- Situation** – here you indicate which of the parties will have a tactical edge over the other
- Disadvantage** – you start at a lower altitude than the enemy
- Advantage** – you start at a higher altitude than the enemy.
- None** – you and your enemy are at the same altitude.
- Target** – type of ground target. It can be left out if you want to;
- Defence** – here, ground anti-aircraft defence is involved. It can be either included or left out. You can save the settings you have chosen and load them later using the **"Save"** and **"Load"** buttons respectively.

Lastly, after you have tuned the generator to your liking, press the **"Fly"** button – and start your flight.

If your intentions change, you can hit the **"Back"** button and return to the main menu.

14 MULTIPLAY



"IL-2 Sturmovik" offers two main options for working on live targets – via Internet or through a LAN. The choice is made in the multiplayer mode settings (accessed via the **"Hardware Setup"** item in the main menu).

Hitting live targets is not necessary though. **"IL-2"** offers two multiplayer types:

- Dogfight** – fight between live opponents;
- Cooperative** – cooperative fulfillment of a mission where the part of opponent or ally can also be played by AI (computer controlled aircraft or vehicles and other ground objects).

Having chosen the **"Multiplay"** item in the main menu, you access a new menu with the following main options:

- Join Server** – log on to the existing server;
- Create New Server** – create a new server yourself;
- Main Menu** – return to the main menu.

Logging on to the existing server. After choosing the **"Join Server"** option, you have two possibilities:

1. Enter the server address in the **"Server Address"** field.
2. Search for all servers available using the **"Search for Local Servers"** command (for more information, read the IL-2 README file in Windows:
Start Menu > Programs > Ubi Soft > IL-2 Sturmovik > Read me 1st).



The result of the search is a list of servers with the following parameters:

Address –	server address
Name –	server name (if it was set on the server)
Ping –	indicator of each server's connection speed. The lower the value, the higher the speed (and this is exactly what you need)
Users –	the number of players logged on to the server
Type –	type of the game (already mentioned: Dogfight and Cooperative)

You should choose a server from the list and press the "**Join**" button. You can also interrupt the process and return to the main menu with the help of the "**Back**" button.

NOTE: You can only join an existing Cooperative server BEFORE THE GAME STARTS. However you can connect to Dogfight server at any time.

Creating a server

The minimum speed connection for acceptable Internet play performance is a 28.8K modem connection to your Internet Service Provider.



You need to detect your server IP. Do this by running command **IPCONFIG** on the server machine.

- Win98 > run Programs > Dos prompt > type **IPCONFIG** and read the **IP ADDRESS**.

- Win2000 > run Programs > Accessories > Command Prompt > type **IPCONFIG** and read the **IP ADDRESS**.

Send this **IP ADDRESS** to your friends.

For network play, launch the IL-2 integrated server. You must choose the **Multiplay** item in the main menu, then **Create new server**. After that you can proceed to the following items:

Name –	the name of your server.
Description –	here you can explain the map, time, weather and other conditions and settings you wish to use. Clients will see this string before the connection and decide which server to choose.

Game Type –	as mentioned previously. Dogfight is air combat between live enemies. Cooperative stands for cooperative mission fulfillment depending on the offered scenario.
Max. Players –	the maximum amount of players on a server. Ranges from 2 to 32 (up to 16 in Cooperative). Naturally a larger amount of players translates into more serious demands on your hardware.
Password –	use this item if you want to you can create a game only for the people you know. Multiplayer sessions can be locked with a password to keep stray gamers away. You can set a password: those who want to log on to your server must know it. To change your password, press the Change button.

Once you have set the above parameters accordingly, click the **Create** button and server will be created. The next step is choosing your mission. You can load any standard mission or a mission you created with the built-in mission editor. In either case, all mission data will be sent to all the clients.

After the mission has loaded, you can change the **Difficulty** settings. This can only be done on the server. Clients get these settings from the server so all they all have the same **Difficulty** settings.

You then have to make the common choice of **Born Place** and **Arming** for the integrated server and client.

Press the **Fly** button and play.

After connection

DOGFIGHT: Before you press the "Fly" button, you should choose the aircraft you wish to fly (press 'Arming'), set "Convergence", "Delay", "Fuel Quantity" just like in Single Play section. The difference lies in the fact that here you can take a look at everything, change the aircraft's camouflage (if other skin variants are available), the face of the pilot, nationality, regiment, number of your plane, etc. See additional features in the IL-2 README file In Windows: Start Menu > Programs > Ubi Soft > IL-2 Sturmovik > Read me.

When you are through with these operations, go back to the previous menu and choose home base on the map, from or above which you prefer to start playing (whether you start from home base or in the air above depends on the server's Difficulty settings).

COOPERATIVE: Here you are taken to the "waiting hall". This is where everyone gathers and waits for the mission.

The mission is then chosen (this is done from the server) and all agreements between the players are set. For these purposes, you can use a built-in chat or voice chat.

You should choose an aircraft or gunner seat (if available) that has been previously agreed on with other players. The gunner/pilot seat you have chosen will be indicated/shown to the other players awaiting the beginning of the mission. You will also see all free or occupied aircraft before the onset of the mission.

When everything is settled and chosen, press the **Fly** button. The mission starts from this point for all players connected to your server.

NOTICE: All the Difficulty settings can only be set on the server. Other players can only read them by pressing the "Difficulty" button, but cannot change them. Thus, the same level of difficulty is set for all players.

Chat in Multiplay



Chat works all the time and in all the Multiplay menus, except when you just begin to set the server or just begin to connect :).

In any multiplay menu, after connection you can activate chat by pressing the corresponding button which you defined in **"Controls"**. In flight – by pressing this button or by pressing **"M"** (displays map by default settings in **"Controls"**), click the mouse

button on the chat window.

The chat has the following features:

You can type messages

- to all players
- to your 'army' (army defined by color of airfields and icons, if the icons used in the difficulty settings)
- to any single online player

To send a message to all players, type the message, then press **Enter**. The program subsequently prompts you to select a recipient of the message. Select **ALL** and press **Enter**.

To send a message to your army, type the message and then press **Enter**. Then, as above, the program prompts you to select the recipient of the message. Select **MY_ARMY** and press **Enter**.

You can also send messages to any of the players. To do so, you need to know the player's correct nickname. Type the message, select the free text line and type the player's correct nickname (call sign) before pressing **Enter**.

To find out the nicknames of all the players, type the following in the line for the special message special:

>user

then press Enter. You will see the nicknames of all players currently playing the game.



UBI.COM GAME SERVICE

Get ready to experience IL-2 Sturmovik on ubi.com's new Game Service, the quickest and easiest way to find your friends and play with them over the Internet. This free service is easy to setup and is included on your game CD. If you have not installed it yet, go right ahead. Other players are waiting for you on-line.



1. How do I join in?

Once IL-2 Sturmovik and the ubi.com Game Service are installed on your system, you can join the Game Service community in three different ways :

1. Simply go to <http://gamingzone.ubisoft.com>. From there, select IL-2 Sturmovik.
2. On your desktop you will find the **"Play it on ubi.com"** icon. Click on it.
3. Start the game and go to the Multiplayer menu. **Press the "Play it on ubi.com !" button.**

Both ways will take you to the IL-2 Sturmovik Gaming Zone page. From here you will have to create a FREE user account. To do this, click the "Create Account" button and enter your information. If you are already registered to ubi.com, simply click the Game Lobby you want to join and you'll be taken to it.

2. How does the Game Lobby work?

The game lobby is pretty straightforward. You can chat with other players, join IL-2 Sturmovik game sessions or create your own.

To create your own game session, click the "Create Session" icon and enter your preferred session parameters, then click the "OK" button. Once in your session, you can always go back to the main lobby to invite players to your session by using the upper-right tabs just beside the player list. Once you are ready to start your game, click the "Start Game" icon. You and your friends will jump right into the game.

To join a session, click the session icon you want to join and you'll be in before you know it. You will have to wait for the session master or host to start the game in order to start playing. Note that you can sort the game sessions by selecting either Dog Fight or Co-Op sessions using the dropdown list found over the session tabs.

3. What else does the G.S. offer?

The ubi.com Game Service also offers a special Friends List for you to keep in touch with your friends. Experiment with it a bit and you'll quickly notice that it has a lot of useful features like in-game voice chat, a Pager, File Transfer and many other features.

The Friends List even tells you which game your friends are playing and it lets you join them with just one click.



Another important feature of chat that you can use is to preset certain messages which you may use often. This really saves time since you no longer have to repeatedly type the same messages.

Activate the chat window, select – using the cursor keys - the line below the chat line and type your message, for example **Check you Six, Break Left, Break Right**, etc. To use this message whenever you want without having to type it out again: Activate chat, select the message using the cursor keys and press **Enter**. Then select to whom you want to send this message (see above). If you need to make corrections or replace the old preset message with a new one, use the Delete and **Backspace** buttons.

One more important feature: you can resize the window or move it using the mouse.

15 FULL MISSION BUILDER

It is high time to talk about the mission editor. This editor provides for fully manual creation of missions with thorough development of all possible nuances. Its interface differs considerably from the game's general interface, and is based on pull-down menus for the most part.

Remember that the editor can work both in 2D and 3D modes. 3D mode can be very useful for indicating exact positions of ground objects. For instance, it allows the tanks in defence to use natural shelters most effectively.

Description of pull-down menus

File menu

Used for loading necessary and input data, testing the results of your work and saving. It contains the following options:

- Load Map** – loads the map where the mission will unfold;
- Load** – loads a mission that was saved earlier with the purpose of doing more work on it;
- Save As** – saves a created mission;
- Play** – launches a created mission for testing. The mission has to be saved on your disk beforehand;
- Exit** – quits the editor.

Edit menu

Judging by the title, this menu is designed for editing different mission parameters. It consists of:

Conditions – this option activates a dialog box where overall conditions for the mission are set. These include time of the day, weather conditions and clouds;

Description – activates a dialog box where all text information related to the mission is edited: its brief and full description and the text corresponding to the combat task;



Delete All – this command deletes all objects you have created. It is very convenient when you have just finished creating a mission and want to start creating another one. If you use this option it saves you the necessity of reloading the same map.

View menu

This menu is intended for different operations with objects. It contains the following menu items:

Landscape – viewing the landscape with different lighting. Having set the optimal level, you can achieve a sharper contrast of all mission-related signs against the landscape; you can also display/hide the landscape.

Destruction – used to set the initial level of building destruction in towns, cities and settlements. Brightness adjusts color brightness in the area allowed for the given operation.

Brush Size adjusts the thickness of the "brush" determining the zone of destruction.

Destruction Level – sets the level of destruction within the zone colored with a brush. The left position represents no destruction and bright green color (if restored after invalid actions beforehand); the right position represents maximum destruction. The color in this case will be red. All operations related to the **Destruction level** settings on the map are performed using the mouse cursor while pressing the F key at the same time. In

Destruction mode, you can also destroy – using the mouse - any bridge in that area. Just click on the left or right mouse button on the bridge to destroy or recover that bridge. This function only works only in 2D mode with the zoom to object in the center of the screen.

Display Filter – this menu item enables/disables the display of the types of objects indicated. This is required to prevent a complicated picture from becoming overloaded with unnecessary icons;

Icon Size – size of conventional icons. It can be modified to reach an optimal correlation between their readability and picture readability in general at different resolutions;

Hover Camera – sets a fixed camera height in 3D mode. This simplifies shifting objects already set;

Show Grid – shows/hides the reference grid;

Smooth Transitions – if the option is switched on, the transition from the 2D to 3D image is performed smoothly.

Operations in the editor

Working with the map and 3D landscape

To switch between 2D and 3D modes.

Press Enter. It works when the scale of enlargement has practically reached its maximum value.

To scroll the map in 2D mode.

Map scrolling can be done in two ways.

1. Using the vertical and horizontal scrollbars – the same way as any other scrolling in Windows interface.



2. Using the cursor of the mouse with the left button pressed.

Landscape navigation in 3D mode

The cursor is the center of all movements; it is constantly depicted in the center of the screen. Changing the direction of your glance against the cursor is performed with the help of the mouse. Approaching/moving away is done by moving the mouse up and down without releasing the pressed left button. The cursor itself can be moved using the mouse with the right button pressed (here the cursor does not change its position, but the landscape under it starts moving).

Changing the scale

If the scale constitutes 0.3 of the minimum, the map mode switches off and the editor turns to 3D relief representation mode.

Here two means are used.

1. The scale can be changed using a vertical scrollbar at the left of the screen. To scale up, drag the scrollbar down.
2. When you move the mouse with the left button pressed and press SHIFT at the same time, a small frame appears on the screen. As soon as the button and the key are released the editor will switch over to the scale at which the field available will be depicted in the frame.

Working with objects on the map/landscape

Setting the chosen object.

First of all you should choose the object. Then move the cursor to a point on the landscape and press the left button simultaneously with **CTRL** (or just press **Ins**). The object will subsequently appear in the designated place.

Editing the route of an object.

Once you have set the object, you can choose a route for it using turning points.

A new turning point is set in the same way as the object itself.

To choose a turning point, click on it; the turning point will become yellow.

To set an **interim turning point** you should choose one of the ready points on the route and press "Ins", or while holding down the CTRL key, press the left button of the mouse. In this case the new point will appear on the ready route in the middle of the segment between the chosen point and the one after it.

To **cancel a choice**, press the right button of the mouse. A menu will then appear right under the cursor. Choose "Unselect"; the yellow marks subsequently disappear and all points of the route become red.

You can **delete a chosen turning point** by pressing the right button of the mouse and choosing "Delete" in the menu. The chosen point will be deleted. Deleting point number 0 annihilates the object.

Object parameter setting window



These parameters are divided into three main groups:

Type

All available objects are divided into categories. We provide a more detailed account of this division below.

After you have set the object category, you can choose it from the list and, if necessary, see its 3D picture (for this press the "View" button). You can revolve it by clicking on it with left mouse button.

When the picture appears on the screen, the View button changes to Hide. If you press it again, the 3D image will be deleted.

Properties

Here you set the parameters directly related to the object.

They depend on its category as follows.

Category **Aircraft** (air objects). The list of parameters includes:

Army. Here you set the side for which the selected object will fight. There are two variants: Red (the Soviet Union) and Blue (Germany). The choice is not bound to any specific type of object; you can make "Messerschmitt" carry red stars in your mission if you want to and vice versa.

Regiment. Here you choose the regiment, squadron and flight.

Each squadron can have up to four flights. The choice influences the corresponding markings on the aircraft.

Moreover, the same subdivision cannot be employed twice as two different objects.

Weapons. The list of possible weapons the aircraft can carry depends on their type. The **By Default** variant means that only guns and machine-guns are included. The None variant means that all weapons have been removed.

Fuel. Fuel amount carried by each aircraft at the onset of the mission, in percent.

Planes. Number of planes in a flight. Ranges from 1 to 4.

Skill. Skill level of the flight pilots. Ranges from 0 (beginner) to 3 (ace).

Player. To be selected if you are going to lead the flight yourself. To be able to do so, you must make sure that the planes in the flight are in the flyable list, i.e. can be piloted by the player.

In Single Missions where ranks are not envisaged, you are automatically appointed commanding officer. If the mission is created for Campaign mode, your rank and your career results directly influence which plane in the flight you will fly.

CAUTION: to prevent situations involving incorrect behavior of AI-led aircraft, always comply with one rule: the aircraft led by the player should always be in the first flight. It is also important to stay away from tasks that cannot be fulfilled (for example confront bombers with fighters task).

TIP: You can create a mission in which you are not going to participate directly at all. In other words you are not using the Player option – the **Player** option wasn't selected. In this case, at the beginning of the mission you will find yourself in observer position and will be able to switch between views of different objects. To do this press **"P"** right after such a mission starts to pause the game, and then find the appropriate position for action viewing in the mission by switching between the different views (using a combination of buttons: Next Enemy Chase View, Next Friend Chase View, Chase View, External View on Ground Target, External Padlock To Closest Ground Target, External Padlock on Air Target, External Padlock To Closest Air Target, Fly-by View, Next Enemy View, Next Friendly View, Wide View, Normal View, Zoom View in combination with the mouse). You can also switch between views over and over again choosing the most interesting moments of fighting both in the air and on ground. After that you can also record a track file and edit it later.

Armor, Vehicles, Trains, Ships, Artillery Categories. For these you set the Army and enter markings, which carry no functional meaning in mission structure and serve for explanation alone.

Waypoints

Here you set the parameters of a selected waypoint. As in the Chief Actor section, they depend to a large extent on the category of the object.

To make the choice of waypoints more convenient, we have placed Prev and Next buttons on the Waypoints panel. If pressed, they activate the corresponding previous or next waypoint on the route. On their right there is a sign, which looks like A(B), where A is the number of the current point and B the overall number of waypoints.

Waypoint numbering starts from 0.

Waypoint parameters for category AIR

Height. Waypoint height above the earth; in meters.

Speed. The speed at which the flight of planes should pass the point.

Time. The time at which the flight should arrive at the point. Changing the Time parameter affects the Speed parameter along the whole route and vice versa.

Type (type of activity). What the aircraft will be doing at the designated point. There are four options:

NORMFLY – by default. Usual flight.

TAKEOFF – if you select this option, the waypoint will be moved to the nearest airdrome.

LANDING – in this case the waypoint will also be moved to the nearest airdrome. If you place it manually to some point in the field, the aircraft will land there.

GATTACK – ground attack.



Target. Here you set the target for attack. If you press the Set button the cursor will switch into choose mode (you can cancel it by pressing the right mouse button). You can set the target in this mode; when the flight reaches the waypoint it will try to attack the target. If you choose ground target the type of activity will change into GATTACK.

NOTE:

1. For dive bombers, fighters with bombs and IL-2s, you have to set target objects for the GATTACK point. Otherwise they will attack the nearest enemy object closest to the waypoint, if only they can find it.
2. For transports with bombs and level bombers: Set waypoint **DIRECTLY** over the object which you would like to destroy, then set GATTACK for that waypoint. Planes will drop the bombs in that area (you must set the GATTACK waypoint **WITHOUT** target object!). Do the same if you use the planes with paratroopers as loadout.
3. For dive bombers and fighters-bombers (IAR-81, some of FW-190s) with bombs the altitude has to be **MORE THAN 1300m** for dive bombing. Otherwise they drop bombs as level bombers.
4. If you want any of selected groups of planes with bombs to do level bombing, go to item 2 above.
5. Don't set an altitude that is too low in bomb target areas for level bombers. They may be destroyed by their own bomb explosion...
6. Don't set the previous waypoint too close to the point of GATTACK. Planes don't get time to rejoin the right formation for the attack. Usually it is enough to set 7-10 km between these waypoints.

TIP: If you have difficulty setting GATTACK on a bridge or other objects/units, you need to center them on the map and make zoom.

SPECIAL FEATURE

How to make air trains of He-111z with glider Me-321 or Li-2 with glider G-11.

1. Set all waypoints for the flight of He-111z (or Li-2).
2. Set **ONLY ONE** waypoint for glider Me-321 (or G-11) and locate the waypoint close to the **FIRST** waypoint of He-111z (or Li-2).
3. Set target object of that Me-321(G-11) first waypoint to the first He-111z(Li-2) waypoint.
4. Don't set any waypoints other than the first for the glider (Me-321 or G-11). The glider will follow the plane automatically.
5. You can set these first waypoints for both planes and gliders in the air or on the ground (Take Off)

NOTE: These trains can't land. If you set the landing waypoint for the plane, the glider will disconnect and try to find an area for landing. When you carry out such missions, you should remember that only in the test flights can you get the right result and the glider will make the right landing (not in a forest or a city for example). The glider does not use the engine and will merely glide to the closest free area, if there is one.



Waypoint parameters for Armor, Vehicles, Ships:

Time. Here everything is much the same as in the AIR category with just one exception – you cannot vary the object's speed. The object will do its best to arrive on time, but in the end everything will depend on its maximum speed and the type of landscape.

Timeout. You can make a ground or sea object stop and wait for some time before it resumes movement.

NOTE: setting objects for **Armor** and **Vehicles** categories by roads or directly on roads which run in the direction of your next Waypoints forces these objects to automatically continue their movement along these roads (except the main roads branching into smaller ones in towns and settlements where the correct movement of objects can only be set with a large number of waypoints, placed on the curves and turns of the streets).

NOTE: Units in the **Ships** category have simplified AI. They fully interact with the environment in modeled battles, but will never do AI-controlled maneuvers. So, you need to set all their waypoints manually in order to avoid collisions between ships and the beach. For example, if you model the attack of a torpedo boat you should create the right trajectory of waypoints on the map to get the correct final picture of sea battle. For this purpose, use several static cameras placed in the battle area to watch the interaction between the ships running in the scenario in FMB, and then correct if necessary.

Waypoint parameters for Train category:

Everything is much the same as in the previous cases, except for the fact that the trains do not stop on the route. There is no Timeout parameter for them naturally.

Stationary Armor, Stationary Objects, Stationary Aircraft, Stationary Ships Categories. These objects are stationary. Waypoints are not set for them. All stationary objects placed on the map and equipped with arming (except planes) will also take an active part in military operations.

NOTE: After you have set a Stationary Object you should define its correct position to other objects, for example correct direction of gun fire against advancing enemy or correct placing of the aircraft on the airdrome. To do this click on the object with the maximum zoom in 2D mode and orient it in the right direction using the Right (Grey) Num Pad buttons.

Setting mission purposes

This is also done using the window for setting object parameters. Choose Target category in the Type section. During task editing, the parameter window consists of two sections: Type and Target. The purpose of the mission is put on the map (or landscape) just like any other object.



Type section.

Below is the list of possible purposes:

Destroy. The object nearest to the designated waypoint receives the "destruction" icon. The task is considered fulfilled if the marked object has been destroyed.

Destroy Bridge. The same as Destroy, only in this case the icon is put exclusively on bridge type targets.

Destroy Ground. An area of a set radius is marked around the designated point. To fulfill the task, you must destroy at least half of the enemy objects within the radius. The size of the zone of destruction and the time interval are set in the Target section.

Escort. The aim is a group of planes; you should escort them and protect them from air attacks. The time interval within which you should escort them is set in the Target section.

Defense. The aim is a ground object. You have to protect it from being destroyed by enemy forces.

Defense Bridge. The same as Defense, but here only a bridge can be the aim.

Defense Ground. As with **Destroy Ground**, an area is marked around the designated point. To fulfill the task, you must preserve at least half of your ground objects in the area. The time interval within which you should defend the area is set in the **Target** section.

Recon. You have to fly above the waypoint at a distance not exceeding the set parameter and stay there for the set time period. The size of the area and time interval are set in the Target section.

Target section

In this section you set parameters of the task.

Priority

PRIMARY – main task. You must fulfill it for the overall success of the mission.

SECONDARY – additional task. Fulfilling it is not compulsory, but if you do you will be rewarded later when the regular awards and promotions come about.

HIDDEN – a "secret" task. The task says nothing about it, but you can discover them yourself in the course of the mission – and this means that you have another chance to excel.

NOTE: You cannot set **Destroy** and **Defense** purposes as the **Target** for static and artillery units. You only can set for them **Destroy Ground** and **Defense Ground**.

Timeout

Some tasks have to be fulfilled before a set time. If you do not fulfill the task within the assigned period it is automatically considered that you have failed. The "Timeout" field is used to indicate the time before which you should fulfill the task. This condition is activated when you choose "Timeout".

In a number of cases, it is impossible to set the time limit. This concerns **Defence Ground**, **Defence Bridge** and **Recon** tasks.



Distance Bar. If the task involves an area, the parameter sets its radius.

Landing. This option only concerns the tasks of Recon type. If placed, you have to land in the area indicated in addition to simply flying along this point.

NOTE: When you design your own missions the following two points become very important:

1. If you create a mission where you start on an airfield and plan to achieve high altitude, you should set enough waypoints with the right trajectory or spiral curve where the climb corresponds to the right digits of the planes. It is also very important to make the right settings for AI planes. Use climb rate data for each plane from the View Object menu. To make sure that AI planes will achieve the given altitude, set the correct time between each waypoint where planes make a climb to the next altitude. We recommend that you set a realistic data climb rate on the low altitudes and 2-3 times less at altitudes higher than 4,000 meters. It is also very important to know that the first waypoint with the takeoff on the airfield shows the direction of the takeoff – the icon on the runway border shows the direction.
2. If the last waypoint of the aircraft flight is landing on an airfield, make sure that the previous waypoint was set at an altitude of not more than 200-250m and at least 1.5 km before the final landing point and in direction of the landing glissade to the closest runway border (the icon shows the side from which the plane will land). If your flight was at high altitude, make sure you establish as many waypoints as are needed for a smooth dive to the point of the final approach. If you ignore this advice, we cannot ensure that your plane or the AI plane will have no damage when diving from high altitudes at critical speeds. Especially important for bombers!

Static Camera category. Static cameras are placed in the same way as Static Objects. The difference between the two lies in the fact that you can vary camera height against landscape surface, which gives you the possibility for further observation of both ground and sea objects and targets. The **Static Camera** option enables you to create missions that are beautiful and interesting for observation. It is specifically recommended that you use it in the following cases:

1. If you have created an extremely interesting mission and are willing to record it to a **track file** to subsequently show it to your friends as a film, or to place such a **track** on the Internet so that other owners of the game can have a look at it.
2. For controlling your mission creation where a rather large-scale ground battle is taking place according to your scenario. Place enough **Static Cameras** without placing them over the whole battlefield. You should bear in mind that the **Static Camera** is also an object that reduces the overall **Frame Rate**.

We recommend that you immediately place ALL CREATED MISSIONS into corresponding directories. For example, if you have created a mission which you are going to fly through only as a Single Mission, you should save it in a Single directory. The folder corresponding to the country and type of the mission can be chosen in the same folder. If you have created a mission for Multiplay, save it in a corresponding directory for Dogfight or Cooperative.

HOW TO COMBINE THE CREATED MISSIONS IN A CAMPAIGN:

All missions created for Campaign mode are combined by name or number in a special file. You can do this in one of two ways:

1. **Linear.** In this case you will proceed linearly through all the missions present in a list.
2. **Random.** In this case the scenario for the mission will be randomly built, i.e., a randomly branched scenario.

Example of a file for a linear scenario:

```
[Main]
Class il2.game.campaign.CampaignBlue
awards Class il2.game.campaign.AwardsDEfighter
[list]
BF109_1_1.mis
BF109_2_1.mis
BF109_3_1.mis
BF109_4_1.mis
BF109_5_1.mis
```

Example of a file for a randomly branched scenario:

```
[Main]
Class il2.game.campaign.CampaignBlue
awards Class il2.game.campaign.AwardsRUBomber
[list]
IL-2M_1_1.mis IL-2M_1_2.mis IL-2M_1_3.mis
IL-2M_2_1.mis IL-2M_2_2.mis
IL-2M_3_1.mis IL-2M_3_2.mis IL-2M_3_3.mis
IL-2M_4_1.mis IL-2M_4_2.mis IL-2M_4_3.mis IL-2M_5_3.mis
IL-2M_5_1.mis IL-2M_5_2.mis IL-2M_5_3.mis
```

NOTE:

6. For randomly branched scenarios, you can set as many single scenarios as you want. It may be one or 100. In the last case the program will randomly select one of 100...
7. Do not forget that for each scenario you would like to make randomly starting, you need to use only one map for all scenarios starting at that point. This is necessary that to keep all your successful destruction of ground objects such as buildings and bridges recorded in the next mission scenario. Otherwise the program will automatically skip these battle changes of landscape.

The file is created using the Windows Notepad and is saved in the same directory as the missions. For example, folder **Campaign > RU (or DE) > Fighter** (If folder **Fighter** was created earlier you should manually create - in the same directory and in good time - a new folder so as not to delete a previously-created campaign. This can be for instance "Fighter2", "Bomber2", "Fighter-Bomber", etc. Use Windows Explorer for this purpose. All single missions or campaign missions with all subdirectories should be stored in the **Missions directory** of the game root directory). The file should be named **campaign.ini** and should not take any other name, otherwise it will be useless. In addition, using the Windows Notepad, in folder **RU (or DE)** you need to create/edit the **all.ini** file where you create/add the name of the new folder with missions for your own campaign.

Example of file all.ini

```
[list]
Fighter
Bomber
Fighter-Bomber
```

Once everything has been done correctly, you start playing the new campaign you have created by yourself; all actions are performed in the standard way. Simply choose the country for which you have created your pilot's career version and for whom you have created a new career in the **Pilot Career** Menu. You will find campaign you have just created in the **Career** window.

HOW TO CREATE MISSIONS FOR MULTIPLAY.

1. DOGFIGHT

For this Multiplay mode you should create born places and choose a corresponding color for them. Born places should only be located on airdromes. The chosen color will later be detected on the icon indicating that it belongs to an army or airdrome.

CAUTION: You can only set stationary anti-aircraft mountings from ground objects and stationary ships from sea objects. If you ignore our recommendations and set something else, these will be automatically withdrawn from the scenario. We also advise you to steer clear of this to prevent lock-up or crashing of the program.

2. COOPERATIVE

Here everything is done in conformity with Single Missions requirements: all AI-objects available for Single Play can be used in COOPERATIVE as well.

Nevertheless, you must bear in mind the restrictions imposed by data transfer speeds via the Internet:

- The number of planes led by players including gunner seats if the planes are equipped with these should not exceed 16.
- Do not overload your mission with a large number of AI objects because the communication channel may not be able to cope with it, causing the game to periodically hang up for a long time, thus preventing you and your friends from enjoying the fun.



We do not want you to restrict you to a set number of AI-objects. The main rule says the less the better. A huge amount of objects can be set at your own discretion and risk. You yourself should determine the possibilities of your communication channel and those of your friends for gaming in COOPERATIVE mode via the Internet. However, we highly recommend that you familiarize yourself with similar missions shipped together with the game. For this purpose, load our missions in the Full Mission Builder and see how they are done.

NOTE: We do not recommend using the maps with a large amount of buildings in the cities (for example, Berlin where over 500,000 houses are displayed on the map; the status of each house is regularly checked by the program and sent via Internet to other players). This can lead to noticeable online game freezes. Recommended cards include special cards for Online Play as well as **Prokhorovka**, which was initially modeled for not only Single Play, but for COOPERATIVE as well.

16 GAME GLOSSARY

Common:

AI – Artificial Intelligence. In the game industry, this term is used to define computer-controlled units.

FM – flight model

DM – Damage model

QMB – Quick Mission Builder

FMB – Full Mission Builder

Recon – reconnaissance

For the View Object Menu:

VVS or VVS RKKA – Soviet Air Force

Luftwaffe – German Air force

NIJ VVS – Military research institute, where all Soviet, Lend-lease or captured aircraft were tested during or after the war. When we were developing our simulator we used a lot of this data together with original sources from aircraft manufacturers.

Combat Turn – maneuver in which a plane reverses flight direction and gains altitude without losing a great deal of airspeed. In general, a climbing 180-degree turn.

For the Full Mission Builder:

Flak – Anti-aircraft artillery and machine guns.

AA – Anti-aircraft artillery and machine guns.

AAA – Anti-aircraft artillery.

Glissade – Landing trajectory of aircraft.

Born Place – home base where your aircraft will be "born" in a multiplay session.

Russian car column designations:

Rus. Supply Car Column Type I

GAZ-67
2 x ZIS-5 Medical
5 x ZIS-5

Rus. Supply Car Column Type II

Willis MB
6 x Studebecker Truck
3 x ZIS-6 Fuel

Rus. Command Staff Car Column

GAZ-67t
GAZ M1
ZIS-5 AA
2 x ZIS-5
ZIS-5 Radio

Rus. Katyusha Car Column

GAZ-67t
6 x Katyusha
2 x ZIS-5
ZIS-6 Fuel

Rus. Studebecker RL Column

Willis MBt
6 x Studebecker Rocket Launcher
ZIS-5 AA
2 x Studebecker Truck



German car column designations:

Ger. Supply Car Column Type I

BMW Bike
Sd.Kfz.251
5 x Opel Blitz 6700A
Opel Blitz 6700A Medical
Opel Blitz 6700A Radio
Opel Blitz Maultier AA

Ger. Supply Car Column Type II

Kuebelwagen VW82t
Opel Blitz 36S
Opel Blitz Maultier AA
2 x Opel Blitz Maultier
Opel Blitz 6700A Fuel
2 x Opel Blitz 36S

Ger. Command Staff Car Column

Pz.IIF
Sd.Kfz.251
Opel Kadett
Opel Blitz Maultier AA
Opel Blitz Maultier
Sd.Kfz.251

Ger. Motorcycle Column

6 x BMW Bike
Opel Blitz 6700A Fuel
2 x Opel Blitz 36S
Sd.Kfz.251
2 x RSO

Ger. Fuel Supply Car Column

Kuebelwagen VW82
6 x Opel Blitz 6700A Fuel
Opel Blitz Maultier AA

Russian and German train designations:

Fuel Train/AA
Steam engine
Coal Tender
Flat car/AA
8 x Tank car

Freight Train
Steam engine
Coal tender
8 x Box car

Freight Train/AA
Steam engine
Coal Tender
Flat car/AA
8 x Box car

Ammunition Train
Steam engine
Coal tender
8 x Box car/Explosives

Ammunition Train/AA
Steam engine
Coal Tender
Flat car/AA
8 x Box car/Explosives

Freight & Fuel Train
Steam engine
Coal Tender
4 x Box car
4 x Tank car

Equipment Type I Train/AA
Steam engine
Coal Tender
Flat car/AA
7 x Flat car/Equipment Type I
Flat car/AA
Equipment Type II Train/AA
Steam engine
Coal Tender
Flat car/AA
7 x Flat car/Equipment Type II
Flat car/AA

Equipment Type III Train/AA
Steam engine
Coal Tender
Flat car/AA
7 x Flat car/Equipment Type III
Flat car/AA

Passenger Train
Steam engine
Coal Tender
8 x Passenger car

Command Staff Train/AA
Steam engine
Coal Tender
Flat car/AA
4 x Passenger car
Flat car/AA

WEAPON loadout comment (bombs and rockets):

SC 50

Type: General purpose bomb
Weight: 55.5 kg

SC 70

Type: General purpose bomb
Weight: 72 kg

SC 250

Type: General purpose bomb
Weight: 229 kg

SC 500

Type: General purpose bomb
Weight: 500 kg

SD 500

Type: Fragmentation bomb
Weight: 535 kg

PTAB-2,5

Type: Anti-tank bomb
Wight: 1.5 kg

AO-25

Type: General purpose bomb
Wight: 25 kg

FAB-50

Type: General purpose bomb
Wight: 50 kg

FAB-100

Type: General purpose bomb
Wight: 100 kg

FAB-250

Type: General purpose bomb
Wight: 250 kg

AJ-2 Ampoules

Type: Like napalm
Weight: 2 Kg

VAP-250

Type: Like napalm (phosphorus)
Weight: 250 Kg

RS-82, RS-132, M-13 - Rockets with demolition warhead.

BRS-82, BRS-132 - anti-armor rockets

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- Considerable technical data on the trials of the NII VVS. These cannot all be listed here.
- Original manufacturing data.
- Complete technical descriptions and blueprints for most modeled aircraft.

Note: We strongly recommend that you read the book series: "Black Cross – Red Star. The Air War Over the Eastern Front".

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